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BULLETIN

OF

THE NEW YORK BOTANICAL GARDEN

VOLUME XIII, 1925—1929

BULLETIN

OF

The New York Botanical Garden

VOLUME XIII

1925—1929

TABLE OF CONTENTS

No. 46. July 30, 1925

PAGE

Report of the President and Chairman of the Executive Committee 1
Report of the Secretary and Director-in-Chief for the Year 1924 7
Report of the Head Curator of the Museums and Herbarium 18
Report of the Head Gardener 23
Report of the Director of the Laboratories 28
Report of the Bibliographer 31
Report of the Librarian 32
Report of the Superintendent of Buildings and Grounds 34
Report of the Honorary Curator of the Economic Collections 39
Report of the Paleobotanist 40
Report of the Honorary Curator of Mosses 42
Report of the Honorary Custodian of the Local Herbarium 43
Report of the Chairman of the Scientific Directors 44
Schedule of Expenditures during the Year 1924 49
Report of the Committee on Patrons, Fellows, and Members for the Year 1924 60
Report of the Treasurer 83
Reports of the Special Auditor 59, 86

No. 47. June 3, 1926

Report of the President and Chairman of the Executive Committee 87
Report of the Secretary and Director-in-Chief for the Year 1925 95
Report of the Head Curator of the Museums and Herbarium 109

PAGE

Report of the Head Gardener 115
Report of the Director of the Laboratories 120
Report of the Bibliographer 124
Report of the Librarian 125
Report of the Superintendent of Buildings and Grounds 127
Report of the Honorary Curator of the Economic Collections 132
Report of the Paleobotanist 134
Report of the Honorary Curator of Mosses 136
Report of the Honorary Custodian of the Local Herbarium 139
Report of the Chairman of the Scientific Directors 140
Financial Statements 142
Report of the Committee on Patrons, Fellows, and Members for the Year 1925 148

No. 48. June 8, 1927

Report of the President for the Year 1926. 173
Report of the Secretary and Director-in-Chief for the Year 1926 181
Report of the Head Curator of the Museums and Herbarium 191
Report of the Head Gardener 197
Report of the Director of the Laboratories 201
Report of the Bibliographer 206
Report of the Librarian 207
Report of the Superintendent of Buildings and Grounds 210
Report of the Honorary Curator of the Economic Collections 215
Report of the Paleobotanist 217
Report of the Honorary Curator of Mosses 219
Report of the Honorary Custodian of the Local Herbarium 222
Report of the Chairman of the Board of Scientific Directors 223
Report of the Treasurer 226
Certificate of Auditors 227
Report of the Committee on Patrons, Fellows, and Members 232

No. 49. May 31, 1928

PAGE

Report of the Secretary and Director-in-Chief for the Year 1927 257
Report of the Head Curator of the Museums and Herbarium 261
Report of the Head Gardener 266
Report of the Honorary Curator of the Iris and Narcissus Collections 273
Report of the Director of Laboratories 278
Report of the Bibliographer 282
Report of the Librarian 284
Report of the Superintendent of Buildings and Grounds 304
Report of the Paleobotanist 309
Report of the Honorary Curator of the Economic Collections 312
Report of the Honorary Curator of Mosses 313
Report of the Honorary Custodian of the Local Herbarium 315
Report of the Chairman of the Board of Scientific Directors 316
Report of the Treasurer 318
Certificate of Auditors 319
Report of the Committee on Patrons, Fellows, and Members 324

No. 50. May 31, 1929

Report of the Secretary and Director-in-Chief for the Year 1928 351
Report of the Head Curator of the Museums and Herbarium 355
Report of the Head Gardener 361
Report of the Honorary Curator of Iris and Narcissus Collections, 1928 364
Report of the Director of the Laboratories for the Year 1928 368

PAGE

Report of the Plant Pathologist 373
Report of the Supervisor of Public Education 376
Report of the Bibliographer 379
Report of the Librarian 380
Report of the Paleobotanist 382
Report of the Superintendent of Buildings and Grounds 385
Report of the Honorary Curator of the Economic Collections 388
Report of the Honorary Curator of Mosses 389
Report of the Honorary Custodian of the Local Herbarium 391
REPORT OF THE CHAIRMAN OF THE SCIENTIFIC DIRECTORS ... 392
REPORT OF THE TREASURER 394
CERTIFICATE OF AUDITORS 395
REPORT OF THE COMMITTEE ON PATRONS, FELLOWS, AND MEMBERS FOR THE YEAR 1928 400

VOL. 13 No. 46

BULLETIN

OF

THE NEW YORK BOTANICAL GARDEN

ISSUED JULY 30, 1925

CONTENTS

REPORT OF THE PRESIDENT AND CHAIRMAN OF THE EXECUTIVE COMMITTEE 1

Report of the Secretary and Director-in-Chief for the Year 1924 7

Report of the Head Curator of the Museums and Herbarium 18

Report of the Head Gardener 23

Report of the Director of the Laboratories 28

Report of the Bibliographer 31

Report of the Librarian 32

Report of the Superintendent of Buildings and Grounds 34

Report of the Honorary Curator of the Economic Collections 39

Report of the Paleobotanist 40

Report of the Honorary Curator of Mosses 42

Report of the Honorary Custodian of the Local Herbarium 43

Report of the Chairman of the Scientific Directors 44

SCHEDULE OF EXPENDITURES DURING THE YEAR 1924 49

REPORT OF THE COMMITTEE ON PATRONS, FELLOWS, AND MEMBERS FOR THE YEAR 1924 60

REPORT OF THE TREASURER 83

REPORTS OF THE SPECIAL AUDITOR 59, 86

BULLETIN
OF
The New York Botanical Garden

Vol. 13 No. 46

REPORT OF THE PRESIDENT AND CHAIRMAN OF THE EXECUTIVE COMMITTEE

(Approved and ordered printed, January 12, 1925)

THE BOARD OF MANAGERS OF THE NEW YORK BOTANICAL GARDEN

Gentlemen:

I have the honor to submit a report on certain of the administrative activities of the Executive Committee and the Board of Managers during the year 1924.

In order to facilitate an understanding of these matters, reference should be made to certain events of the previous year. In April, 1923, the President laid before the Board a "Statement for the Information of the Board of Managers," consisting of a survey of the status of the Garden, accompanied by recommendations regarding desired improvements. These improvements related to the introduction of more esthetic features of the grounds and greenhouse collections, the extension of floral exhibits, the broadening of the scope of the *Journal,* the more efficient protection of the grounds, the extension of the scientific research into timely problems of experimental botany, which in turn would require a larger scientific staff and additional laboratories, higher salaries and a pension system for the staff, and, for the installation and

maintenance of these various features, a substantial increase of the Garden's funds. These recommendations were duly approved in principle by the Board. In the summer of 1923, Messrs. Olmsted Brothers, landscape architects, were commissioned to make a study of the grounds of the Garden and submit a comprehensive plan for their treatment and development. This study was begun by Mr. Frederick Law Olmsted and his associates in October, 1923, and a preliminary report was submitted in the following December. After detailed consideration of the features of this report by the members of the Board, collectively and individually, and many conferences with Mr. Olmsted and his associates, a final report was submitted in August, 1924.

Some of the features of this report are as follows:

It points out that the area occupied by the Garden, with its unusual natural features, some of which have been sadly mistreated or neglected in the past, can be made an area of superior beauty, superior interest to visitors and inspiring to lovers of flowers and gardens and all the amenities which living plants have to offer to the life of man. The requisites toward the accomplishment of this are: improved maintenance of the grounds as existing, improvements constituting alterations of existing features, and improvements constituting new features. Examples of these improvements are as follows:

The automobile is one of the enemies of beautiful territories and—what was not foreseen when its present road-system was planned—the Garden has now become one of the great highways of motor-car through-traffic. Making the Garden merely a convenience in enabling the motorist to arrive at his destination is wholly contrary to it spirit and meaning, and through-traffic should be either excluded from it altogether or relegated to its extreme borders. Interior roads are necessary for the convenience of visitors, but certain of the existing in-

terior roads may well be eliminated and the ground now occupied by them be restored to its original natural beauty. Some modifications and extensions in the system of paths should be made for the purpose of distributing the many visitors who come to see the Garden on foot and leading them on from one feature to another. By skilful planning and planting, the western portion of the area, lying near the entrances through which come most of its visitors but now one of its least attractive parts, should offer welcoming and enticing features. More might be made of the opportunities offered by the Water Gardens northeast of the Museum building. The great collection of shrubs near the northern end should be partly rearranged with a view to better esthetic effects without diminishing their scientific value. The Horticultural Garden in the southwestern section should be extended and intensified by the planting on its attractive slopes of more irises, peonies, chrysanthemums, narcissi, and other plants which lend themselves to mass effects, and might be the beginning of a transverse vista looking eastward across the Bronx River. The considerable area on the east side of the river at this point is now disfigured by unattractive greenhouses and associated encumbrances which are retained by the Park Department and used for the propagation of ornamental plants destined for the various public parks of the Borough of the Bronx. Nearby are the large and unkempt stables used also by the Park Department for the repair and storage of Park property. With these aberrant desecrations removed, the large area in question offers remarkable opportunities for the installation of an inviting Landscape Garden, with a long north and south vista tying in with the transverse vista above mentioned, and marked by an extended lawn and masses of flowering shrubbery and flowering herbaceous planting, bordered and backed by artistically grouped trees. At the side of

this attractive feature, the gorge of the Bronx, now controlled on its eastern side by the Park Department, should be restored to its original state of rugged, picturesque beauty. Farther to the eastward, the old lake valley, now deprived of its former water supply, should be developed as a Rhododendron Glade with a rich and effective planting of varieties of rhododendrons, azaleas, ferns, heather, huckleberry, cranberry, laurel, and related plants. The Cherry Garden in the northeastern section should be in part replanted to make more effectively beautiful its valuable collection of Japanese flowering and other species. In the series of open spaces in the southern section bordering Pelham Parkway, there might advantageously be placed a variety of Model Gardens, changing now and then and purposed to demonstrate to residents of cities and their suburbs how city back-yards and small suburban places may be treated, by proper planting, to relieve their barrenness and make of them attractive homes.

After full consideration, the Olmsted Report was unanimously approved by the Executive Committee and, on November 20, 1924, by the Board in the following resolution:

> Resolved, that the Report of Olmsted Brothers be approved in principle as a guide for future treatment of the grounds in the Garden except that there be reserved for future consideration that part of the Report which deals with the proposed modification of the present road system; and that this Report be printed.

It should be added here that the group of the members of the Board constituting the Scientific Directors began in September, 1924, the preparation of an analogous comprehensive plan for the future scientific research of the Garden, and that such plan has now been completed and adopted as a future guide for this very im-

portant feature of the Garden's activities. The plan points out that, while the Garden's growth up to the present has provided more or less adequately for research in systematic botany, paleobotany, and economic botany, research in other fields has had to remain relatively undeveloped; yet it is in these other fields where lie many pregnant problems of the science of plants. These deal with the plant as a living organism; its internal life processes, its relations to the environmental factors of the air and the soil that are continually acting upon it, aiding or obstructing its growth; the problem of its diseases; and the possible ways and means of obtaining new and often better types of plants. These problems lie within the scope of experimental botany and in the solving of them the Garden can perform a most important and timely service to mankind. For their solution the large and varied collections of the Garden present unrivalled opportunities, but there are needed properly trained experimental botanists and properly equipped new laboratories.

In the President's "Statement" of April, 1923, to the Board of Managers, it was pointed out that the declaration of the purposes of the Garden in the Act of Incorporation, passed in 1891, reveals "a two-fold duty on the part of the Garden—a duty to the lay public and a duty to botanical science." Now, through the adoption of the Olmsted plan and the plan of the Scientific Directors, the path is clear along which the Garden should proceed in performing its duty to the public and to science. The Executive Committee and the Board of Managers have recognized fully that the performance of this duty would require much greater funds than the Garden has heretofore had at its disposal. Careful estimates have placed the additional funds needed at not less than $7,000,000. Such a sum must be sought, and its chief source must be private benefactions. On Novem-

ber 11, 1924, the Executive Committee voted to enter upon a campaign to raise the sum of $4,160,000 in order to begin the realization of the full plan. A Campaign Committee was appointed and has made plans for entering immediately upon the task before it. These actions of the Executive Committee have been duly approved by the Board.

Such, then, is the situation that confronts the Garden at the beginning of 1925. The task before this Board is not a small one, and it can be quickly performed only through the personal assistance and the personal generosity of each of the Board's members. Each member of the Board ought to regard himself as ex officio a member of the Campaign Committee and be willing to lend a share of his energies in performing its labors. This may rightly be regarded, I believe, as a test of his interest in the Garden and in the opportunity of putting it into its rightful position of leadership among the scientific, educational, and philanthropic institutions of the day.

I beg to append the following documents:

A Statement Concerning The New York Botanical Garden: Prepared for the Information of the Board of Managers. April, 1923.

Report on The New York Botanical Garden: By Olmsted Brothers. 1924.

The New York Botanical Garden: A Report by the Scientific Directors on the Scientific Research of the Garden. January, 1925.

The New York Botanical Garden: Its Status and Needs. 1924.

Respectfully submitted,

FREDERIC S. LEE,

President, and Chairman of the Executive Committee

(7)

REPORT OF THE SECRETARY AND DIRECTOR-IN-CHIEF FOR THE YEAR 1924

(Accepted and ordered printed, January 12, 1925)

To the Board of Managers of The New York Botanical Garden.

Gentlemen: I have the honor to submit my report for the year ending January 12, 1925.

Large increases in the special collections of hardy herbaceous plants were made during the year, including the nearly complete primary planting of the new Rock Garden, under the direction of Dr. Southwick, with valued coöperation by Mr. Clarence Lown, of Poughkeepsie, and other friends who contributed plants of many rare and interesting kinds; a new connection with a high-pressure water-main on Pelham Avenue, made for us by the City Department of Water Supply, Gas and Electricity, has greatly improved the water-supply of the Rock Garden and of the Horticultural Grounds nearby.

The Garden's floral displays during the past year have excelled those of any previous year in quantity and general interest. In the late spring and early summer, a succession of cool moist days was especially favorable to the perfecting and long duration of the flowers. The exhibits of tulips, irises, and roses were remarkably effective. The planting of 80,500 tulip bulbs of 154 varieties, given by the Dutch Bulb Growers' Association, was referred to in our report of a year ago. The last week of April, the month of May, and the first week of June saw the culmination of the brilliant display that was made possible by that notable gift.

The flowering of nearly 1,200 varieties of iris in late May and early June gave an attractive show of color in the Horticultural Grounds. Later, through the supervision of Mr. John C. Wister, President of the American

Iris Society, and Mrs. Wheeler H. Peckham of our Advisory Council, 870 varieties were established in new beds in alphabetical sequence to facilitate the finding of named varieties by visitors to this Iris Test Garden, which is being maintained by the joint efforts of the American Iris Society and The New York Botanical Garden.

In the Rose Garden, the 200 climbers given by Bobbink and Atkins and planted out last autumn at the foot of tall red-cedar posts, gave a little foreshadowing of the future importance of this addition to our rose collection. There are now in the Rose Garden somewhat more than 4,500 plants. Most of these made a beautiful showing during parts of June and July and many of them had a prolonged second period of bloom in late summer or autumn.

The dahlia collection was somewhat enlarged and included nearly 1,000 plants, representing about 450 of the best modern varieties. Last season, for the first time, groupings of some of the freer-flowering varieties for color effects was attempted. The bed in which the orange and salmon-pink varieties were massed was particularly successful and effective. Both amateur and commercial growers of dahlias from the metropolitan area and also from more remote localities appear to be acquiring the habit of visiting our dahlia border to keep in touch with the latest developments in this rapidly growing branch of horticulture.

A notable addition to our collection of ornamentals was the gift of Mr. A. E. Kunderd, of Goshen, Indiana, of 4,100 Gladiolus corms, representing 81 varieties, all of which developed in a most attractive fashion.

The Garden's floral displays of Japanese cherries, rhododendrons, "flowering" apples, lilies, rose-mallows, water-lilies, hardy and indoor chrysanthemums, etc., were also instructive and noteworthy.

Extensive plantations of Narcissus, including 166 species and varieties were made in the southern portion of the Horticultural Grounds. Altogether nearly 50,000 contributed by the Dutch Bulb Exporters' Association of Haarlem, Holland, and some 10,000 were given by Mrs. Wheeler H. Peckham, of the Advisory Council, or purchased by funds obtained by her for the purpose; she also directed the planting of these bulbs.

CONTRIBUTIONS TO NARCISSUS FUND

Mr. H. F. du Pont	$ 25.00
Miss Irma B. Levy	10.00
Morristown Garden Club	35.00
Mrs. Charles W. Pratt	5.00
New Canaan Garden Club	25.00
Hastings Garden Club	5.00
Mrs. Herbert S. Greims	50.00
Larchmont Garden Club	25.00
Mrs. Elizabeth G. Britton	25.00
Mrs. Theron G. Strong	10.00
Mrs. Wheeler H. Peckham	80.00
The Mount Vernon Garden Club	10.00
The Garden Lovers Club	15.00
Mrs. H. R. Mallory	25.00
The Stamford Garden Club	10.00
North Country Club	10.00
Garden Club of New Rochelle	25.00
Total	$390.00

The gift of the Dutch Bulb Exporters' Association included also 6,000 bulbs of choice varieties of hyacinths.

Under direction of Mr. Percy Wilson, the Herbaceous Grounds' collections have been increased by many species, with considerable rearrangement. Some additions have also been made to the shrub collections in the Fruticetum and to those of trees in the Pinetum and the Arboretum. Rearrangement, replanting, and additions have also been effected in the flower-gardens. The greenhouse collections have been increased, especially by plants grown from seeds; the fine series of bromeliads grown for sev-

eral years in one of the propagating houses, was transferred again to public Conservatory Range 2. Nearly all gardening and horticultural work has been under the supervision of Mr. Kenneth R. Boynton, Head Gardener, assisted by Foreman Finley for the out of door collections, and by Foreman Becker for those under glass; the collections have become so large and the areas under cultivation so great that Mr. Boynton needs more trained assistants, especially in dendrology and floriculture, and also more gardeners.

Forty-one illustrated public lectures on botanical and horticultural subjects and twelve excursions about the Garden were arranged for Saturday and Sunday afternoons from April 5 to November 29 inclusive, the titles of which have been published in the *Journal*. Of these 34 were given by members of the garden staff and 19 by lecturers from the outside. The Sunday lectures were very popular during the months of July and August, as was shown by an increase in attendance over the Saturday lectures, which were better attended in the spring and fall. From December to March special conservatory lectures were given in the central display greenhouse of Conservatory Range 2, where plants and other available material was used to illustrate them. For these occasions the lecturers were always members of the staff.

Much instruction has been given to the public by docentry and otherwise and the correspondence in connection with it has increased substantially.

Our last report referred to the purchase of several thousand volumes of books, which were duplicates resulting from the consolidation of three important botanical libraries in Geneva, Switzerland. During the past year, under the supervision of Dr. John Hendley Barnhart, Bibliographer, and Miss Sarah H. Harlow, Librarian, most of these books have been examined and listed and many of them have been incorporated in our library.

To accommodate this increase, new shelving has been acquired.

The serial publications of the Garden have been continued about as usual, though the publication of a scientific number of our Bulletin (No. 45), in addition to the administrative number (44), represents an advance over the past two years. This scientific number includes Dr. Hollick's "Review of the Fossil Flora of the West Indies," and an important paper on "Hemlock and its environment," by Messrs. Moore, Richards, Gleason, and Stout, which was based in part on studies in our Hemlock Grove. Other publications include twelve numbers of our monthly *Journal,* six numbers of *Mycologia;* four parts of *Addisonia;* five parts of *North American Flora,* and eleven numbers of *Contributions.* These publications have been aided by the income of the David Lydig Fund and the Addison Brown Fund, though one or two of them are now approaching a self-supporting basis.

Dr. John K. Small, Head Curator of the Museums and Herbarium, found time for various lines of botanical research and published a dozen articles dealing with different phases of these investigations. With the generous assistance of Mr. Charles Deering, a member of the Corporation of the Garden, he has been able to continue his exploration of Florida and the Carolinas and has accumulated further plant material, both living and dried, that will contribute much to a better understanding of the flora of the southeastern United States. Dr. Small has also continued his studies of the North American species of Iris and of the spider-lilies (Hymenocallis), and, with the coöperation of Miss Eaton, the Artist of the Garden Staff, he has secured numerous paintings of species of these and other genera, most of which will be used for the illustration of *Addisonia,* accompanying descriptive text that he has prepared.

In connection with his studies of the higher plants of northern South America, Dr. H. A. Gleason, Curator,

spent four months during the summer in critical taxonomic work at the Royal Botanic Gardens at Kew and at the Muséum d'Histoire Naturelle in Paris. Some of the important results of these studies have already been prepared for publication. A new departure in the way of coöperative botanical research is seen in a projected Flora of British Guiana under the joint authorship of Dr. Gleason of our staff and Mr. T. A. Sprague of the Royal Botanic Gardens. The more remote parts of British Guiana are essentially unexplored and it is anticipated that this investigation will bring out much of scientific novelty and importance.

Dr. P. A. Rydberg, in addition to his time-consuming duties as Curator of the herbarium collections of flowering plants, has been able to continue his systematic studies of various genera of the Pea Family, the Nightshade Family, and the Thistle Family, and has published some of the results of his investigations in the North American Flora and elsewhere.

Dr. Fred J. Seaver, Curator in charge of the Fungi, has nearly finished his manuscript on the fungus flora of Porto Rico, prepared for the Botany of Porto Rico, now being published by the New York Academy of Sciences, in coöperation with The New York Botanical Garden, the Insular Government of Porto Rico, etc. He is also continuing his monographic studies on the cup Fungi of North America. On August 1, he took over the editorship of *Mycologia.*

Investigations of sterility and fertility in plants continued to be the chief lines of research activity by Dr. A. B. Stout, the Director of the Laboratories. At the Garden his major effort is still with the day lilies and the true lilies. In his study of the lilies, the practical interest of Mrs. Mortimer J. Fox has again been very helpful. Coöperation with the New York Agricultural Experiment Station at Geneva in the study of sterilities

in various fruit crops and in the breeding of hardy seedless grapes is being continued and promises results of scientific interest and of practical importance in horticulture. Coöperation with the Oxford Paper Company in a study of poplar trees has been arranged and considerable progress has already been made in the projected investigations. Additional equipment for facilitating Dr. Stout's experimental studies at the Garden is much to be desired.

Dr. Arthur Hollick, Paleobotanist, was granted a five months' leave of absence (February 1 to June 30) to continue his studies of the Tertiary flora of Alaska at the U. S. National Museum in Washington in coöperation with the U. S. Geological Survey. He completed an extended investigation of the fossil flora of the West Indies and published the results in the *Bulletin* of the Garden. He completed also and published a study of the Tertiary flora of Brazil, carried on in conjunction with Professor Berry of The Johns Hopkins University, and in connection with the Geological Survey of Canada he has continued his researches on the Pleistocene flora of the Kootenay Valley in British Columbia.

Dr. Marshall A. Howe, Assistant Director, has looked after some of the details of administration and during the absence of the Director-in-Chief in Porto Rico last winter served as Acting Director. During the last five months of the year he took over a considerable part of the work of Supervisor of Public Instruction. He has also had charge of the Garden's large collection of dahlias and the herbarium collections of Algae and Hepaticae. His published papers during 1924 include a report on "Chinese Marine Algae" and "Notes on Algae of Bermuda and the Bahamas." In coöperation with a member of the U. S. Geological Survey, he has prepared for publication a report on lime-secreting reef-forming marine algae of Jurassic age from the mountains of Mon-

tana. A lecture of Dr. Howe's on "Dahlias and their Culture," published in the Garden Journal for September, 1923, has been reprinted by *The Flower Grower*, and, slightly revised, is again in type for the *Year Book of the Massachusetts Horticultural Society.*

Such time as I have had available for investigation has been mainly given to the completion of the Botany of Porto Rico and the Virgin Islands, now in course of publication by the New York Academy of Sciences, as a part of the Scientific Survey of Porto Rico and the Virgin Islands, in coöperation with the Insular Governmnts, the American Museum of Natural History, Columbia University and other institutions.

The following contributions from members of the Garden made possible much of the educational and scientific work during the year:

Dr. Robert Abbe	$ 50.00
Mr. Fritz Achelis	100.00
Mr. Edward D. Adams	100.00
Mr. Vincent Astor	100.00
Mrs. Hugh D. Auchincloss	50.00
Mr. Henry de Forest Baldwin	100.00
Miss Elizabeth Billings	75.00
Mr. George Blumenthal	25.00
Mr. George P. Brett	190.00
Mr. George S. Brewster	100.00
Dr. N. L. Britton	550.00
Mrs. Andrew Carnegie	250.00
Mary and Paul Cheney	20.00
Mr. C. A. Coffin	100.00
Mr. Paul D. Cravath	100.00
Mr. James W. Cromwell	300.00
Mrs. Charles D. Dickey	50.00
Mr. Cleveland H. Dodge	100.00
Miss Ethel DuBois	25.00
Mr. William C. Ferguson	25.00
Mrs. Mortimer J. Fox	100.00
Mr. Childs Frick	200.00
Mr. William Halls, Jr	10.00
Miss Elizabeth Stewart Hamilton	100.00

Mr. J. Horace Harding	100.00
Mr. J. Montgomery Hare	25.00
Mr. Edward S. Harkness	2,000.00
Mrs. Stephen V. Harkness	2,000.00
Mrs. A. Barton Hepburn	100.00
Mrs. Robert C. Hill	50.00
Mr. Anton G. Hodenpyl	100.00
Mrs. Richard March Hoe	25.00
Mrs. Walter Jennings	25.00
Mrs. Delancey Kane	50.00
Mrs. John Innes Kane	200.00
Mrs. Gustav E. Kissel	25.00
Mr. Adolph Lewisohn	25.00
Mr. Kenneth K. Mackenzie	250.00
Mrs. V. Everit Macy	50.00
Mrs. Pierre Mali	50.00
Mr. William J. Matheson	100.00
Mr. Ogden Mills	250.00
Mr. Ogden L. Mills	250.00
Mr. J. P. Morgan	500.00
Mrs. Lewis Rutherfurd Morris	1,000.00
Mr. Charles Lathrop Pack	50.00
Mrs. George W. Perkins	250.00
Mr. W. H. Perkins	100.00
Mr. Charles F. Rand	50.00
Mrs. John A. Roebling	100.00
Mrs. James Roosevelt	50.00
Mr. Mortimer L. Schiff	250.00
Mrs. James A. Scrymser	500.00
Mr. A. R. Shattuck	100.00
Mrs. Finley J. Shepard	25.00
Mrs. Benson B. Sloan	25.00
Miss Ellen J. Stone	50.00
Mrs. Theron G. Strong	25.00
Mr. F. K. Sturgis	250.00
Mrs. Henry O. Taylor	250.00
Mrs. John T. Terry	100.00
Mr. Felix M. Warburg	200.00
Mr. Artemus Ward	100.00
Mr. Allen Wardwell	50.00
Mr. H. H. Westinghouse	50.00
Mr. H. A. Wilson	5.00
Mrs. William H. Woodin	100.00
Miss Julia Wray	100.00
	$12,775.00

The portion of the driveway system from the Rose Garden easterly and northward, long under construction by the Park Department, was opened for use in August, after lights along it had been provided by the Department of Water Supply, Gas and Electricity, following a request by Commissioner Hennessy. The narrow and dangerous road running past the Mansion was then closed, this new road taking its place. These changes have greatly improved the conditions, and have much increased the central area of seclusion. Part of the old road will be available for a path after narrowing and grading along the sides; its northern end was thus transformed into a path, in the autumn, and connected with paths formerly constructed, leading east, west, and north.

The closing of the old road made practicable the demolition of the dangerous ruins of the Lorillard Mansion, destroyed by fire on March 26, 1923. This work was commenced early in October, 1924, and is now largely accomplished except for the removal of much stone, brick, and debris, which is in progress, preparatory to grading and preparing the site for planting. All the material except rubbish, is being stored for future use within the Garden.

It is desirable that the interior driveway system be soon extended by constructing a needed connection from the Rose Garden westerly across the Bronx River below the rapids to near the Iris Garden, requiring a bridge about one hundred feet in length. This connection has long been considered desirable by engineers of the Park Department, by Mr. Brinley and by me, and it appears upon the recent road study by Olmsted Brothers, and on that of Mr. Waldreaon, Landscape Architect of the Park Department.

New construction work was limited during the year to building piers and basement wall for about 350 feet of

boundary fence along Pelham Avenue, erecting about 7,000 feet of guard rail along paths, and building about 800 feet of path.

By thus limiting development we were enabled to use a little more labor in maintenance of plantations and lawns than the year before, especially in the valley of the Herbaceous Grounds and in the Horticultural Grounds, with good results, although two months drought in July and August and another in October were not conducive to luxuriance. Shortage of labor, of gardeners and of keepers still operates to restrict satisfactory upkeep.

A liberal city appropriation for repairs and renewals provided for reglazing the roofs of two greenhouses at Conservatory Range No. 1, for resetting boilers at Power House No. 2, for greenhouse, museum and boundary fence painting, for replacing some greenhouse benches, and for other minor repairs.

I append reports giving details of maintenance, development and instruction by Dr. Small, Head Curator, by Mr. Boynton, Head Gardener; by Dr. Stout, Director of the Laboratories; by Dr. Barnhart, Bibliographer; by Miss Harlow, Librarian; by Mr. Corbett, Superintendent of Buildings and Grounds; by Dr. Hollick, Paleobotanist; by Mrs. Britton, Honorary Curator of Mosses; by Dr. Rusby, Honorary Curator of the Economic Collection; by Dr. Denslow, Honorary Custodian of the Local Herbarium; and a schedule of expenditures by Mr. Groesbeck, Bookkeeper.

Respectfully submitted,

N. L. Britton,

Secretary and Director-in-Chief

(18)

REPORT OF THE HEAD CURATOR OF THE MUSEUMS AND HERBARIUM

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I submit herewith my report as Head Curator of the Museums and Herbarium of The New York Botanical Garden for the calendar year 1924.

The collections and exhibits under my supervision were developed and conserved as in preceding years.

Specimens from a wide geographic range were brought together as follows, and accessioned from time to time in the *Journal*. A summary is here offered:

By gift and purchase	5,112	specimens
By exchange	4,855	"
By exploration	2,071	"

Thus 12,038 specimens were added to the permanent and duplicate collections. The Old World was represented by specimens from Europe, Asia, Africa, and Australia. However, the most valuable accessions—those connected with the immediate constructive activities of the Garden—were representatives of the floras of northern South America, Central America, Mexico, and Hawaii; of the West Indies, particularly Porto Rico and the Virgin Islands and Cuba; and of the continental United States and Alaska.

About 5,000 duplicate specimens were sent to other institutions and individuals in exchange.

MUSEUMS

The collections comprising the public exhibits were displayed as heretofore. No new equipment was added.

The Economic Museum was increased by specimens secured through exploration, by contributions from the Honorary Curator of the Economic Collection (see his report), and by miscellaneous gifts.

The Systematic Museum, comprising the Synoptic Collection, the Local Flora Exhibit, the Plant Picture Collection, and Microscopic Exhibit, remained essentially as it was in the preceding year, except for the addition of specimens secured through exploration, and changes in the objects under the microscopes.

The Fossil Plant Museum was enlarged by specimens mainly from Porto Rico and British Columbia. For details see report of the Paleobotanist.

HERBARIA

The specimens actually added to the permanent collections were drawn from material relating directly to the various interpretative activities of the Garden.

A total of 28,000 herbarium sheets, representing about 36,000 specimens were added to the herbaria. These were divided between the general herbarium, the local-flora herbarium, and the Columbia University herbarium.

The local-flora herbarium was cared for by Dr. Herbert M. Denslow. For details see the report of the Honorary Custodian of the Local Herbarium.

The moss herbarium was in charge of Mrs. N. L. Britton. For details see the report of the Honorary Curator of Mosses.

Various details of the year's activities are given in the several items under:

INVESTIGATIONS AND ASSISTANCE

Where the more important and valuable work of the members of the staff comprising this division is shown:

Dr. P. A. Rydberg, Curator, continued in charge of the collections of flowering plants. The earlier part of the year was mostly occupied in completing the moving and readjusting of the main herbarium, begun during the preceding year. As a result of additional help in mounting

specimens, more time than usual was of necessity occupied in sorting and laying out specimens for mounting or for exchanges, and finally in distributing the mounted specimens into the herbarium cases. In this work he had limited assistance from an Associate Curator. The time left for research and interpretation was principally devoted to the vast genus *Astragalus* and the related genera. The following papers, prepared during 1922 and 1923 were published: (I). One part of the North American Flora, containing a part of the tribe Galegeae of Fabaceae. (II). Notes on Fabaceae—III. (III). Section Tuberaria of the Genus *Solanum*. (IV). Some Senecioid Genera—I-II. (V). Genera of North American Fabaceae—II.

Dr. H. A. Gleason, Curator, had general supervision of the phanerogamic collections from northern South America. His duties included the identification and incorporation into the herbarium of the more recent collections from British Guiana, Colombia, and Ecuador, together with monographic studies on the Vernonieae and Lobeliaceae of these regions. As a part of his duty he spent four months during the summer in taxonomic work at the Royal Botanic Garden, Kew, England, and at the Muséum d'Histoire Naturelle, Paris, France. The results of these studies have been embodied in five scientific papers which have been submitted for publication. He continued to act as associate editor of *Addisonia*, preparing three papers for that publication, and served as associate editor of the publications of the Torrey Botanical Club, as vice-president of the American Iris Society, as director of the Horticultural Society of New York, and as member of the Board of Control of *Botanical Abstracts*. Nine papers of his authorship have been published during the year. He has given five lectures in the Garden series.

Dr. Fred J. Seaver, Curator, continued to act as curator of the ascomycetes and lower fungi, and also of the higher fungi since the retirement of Dr. Murrill on August 1, 1924. The study of the fungus flora of Porto Rico and the Virgin Islands was continued and the manuscript resulting from this investigation is nearing completion. In addition to these duties he acted as unofficial editor of *Mycologia* during Dr. Murrill's sojourn in South America and also since his retirement from the Garden staff. He gave six lectures in the Saturday afternoon course and continued to devote some time to the study of the work of destructive insects. A number of minor papers were published during the year. The major portion of his time devoted to research was spent on the fungus flora of Porto Rico and in continuation of the work on the cup-fungi of North America.

Mr. Percy Wilson, Associate Curator, for the first quarter of the year devoted his time to docentry, to the determination and distribution into the herbarium cases of West Indian specimens, and to the preparation of manuscript and the reading of proof on the Botany of Porto Rico and the Virgin Islands, in coöperation with yourself. He devoted the remaining three quarters to studies in the various plantations of the Garden, particularly to developing them and labelling the specimens.

Mrs. William A. Mitchell, Associate Curator, devoted half time (afternoons) to helping Dr. Rydberg in sorting and distributing the specimens, duplicate and mounted, of the flowering plant collections and to rearranging and renovating parts of the herbaria. She installed a complete series of guide-labels to the families of the flowering-plant herbarium. Much attention was devoted by her to developing the local flora herbarium in the matter of arrangement and geographic distribution.

The writer, in addition to the usual curatorial routine and details, prosecuted several supplementary investiga-

tions which may be referred to briefly: (I). Continued general studies in the flora and floristics of the southeastern United States with the result of increasing the collections with desirable specimens, living and dried, and with a view of interpreting the flora. (II). Devoted some time to field-work in the exploration of the southern Atlantic States—North Carolina, South Carolina, and particularly Florida. (III). Continued studies in North American *Iris*, both in the field and with the live collection assembled at the Garden, having to date secured paintings of the eastern States iris, through the coöperation of Miss Eaton, Artist, and prepared descriptive matter, sufficient for two whole numbers of *Addisonia.* (IV). Continued studies in spider-lilies (*Hymenocallis*), both in the field and in the live collections assembled at the Garden under glass. (V). Increased the photographic collection, phytogeographic and historic, relating to Florida and to the Carolinas. (VI). Secured with the coöperation of Miss Eaton, a considerable series of paintings for *Addisonia,* from subjects sent directly from the field or from plants and seeds sent from the field and grown under glass at the Garden, and from materials secured through correspondence. (VII). Prepared narratives of exploration and miscellaneous popular and technical manuscripts on subjects and observations made during explorations, and published from manuscripts prepared during the year, and previously, a dozen articles in various periodicals. These various investigations and the accessions of materials connected with them, were made possible through the interest and coöperation of Mr. Charles Deering, member of the Corporation of the Garden. We have also had the advantages, for plantings and experiments, of Mr. Deering's reservations at Buena Vista and Cutler, and elsewhere in Florida. In this connection it might be important to record that the Deering reservation at Cutler is fast be-

coming an important botanical garden: a new cactus plantation has been installed there, a palm garden is in the making, and scores of miscellaneous specimens established at the Buena Vista reservation during the past decade and a half are being transferred to Cutler. Interesting and critical material secured during exploration is introduced and grown at Cutler in the open as well as under glass at the Garden.

Respectfully submitted,

JOHN K. SMALL,

Head Curator of the Museums and Herbarium

REPORT OF THE HEAD GARDENER

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to present herewith my report for the year 1924.

HORTICULTURAL OPERATIONS

The gardening staff under the direction of Messrs. John Finley and H. W. Becker, Foremen Gardeners, consisted of 27 gardeners, 14 laborers, and 1 apprentice gardener. The outside force, under direction of Mr. John Finley, after the usual winter lumbering, operated chiefly in floricultural collections. A new Iris plantation on the hill opposite Fordham Hospital, another in the lower garden, a supplemental plantation in the peony garden, and the establishment of the new Narcissus planting were the additions this year.

The first Iris planting consisted of 30 beds, 4,500 square feet, the second of 9 beds, about 1,300 square feet, with 2 more beds, 360 square feet, for new mass planting of dwarf Iris. 1,450 square feet of bed were opened in the peony garden and planted. 7,000 square feet of planting bed were opened for the Narcissus collection. Pelham Avenue, from Southern Boulevard to the Lin-

nean bridge was planted with 560 flowering shrubs such as Forsythia, Deutzia, and Viburnum; 20 trees were planted along roads and paths, and 15 in the fir collection, 2 in the yew collection, 12 in the spruce collection, 32 in the pine collection and 150 in the Pine Forest Plantation.

Mr. Finley's force assisted in the Rock Garden expansion, in the Dahlia, Rose, Iris, Canna, Gladiolus, Narcissus, Chrysanthemum, Lilac, Herbaceous, Pinetum and Arboretum collections, both in planting and caring for the same.

GREENHOUSE OPERATIONS

Mr. H. W. Becker and greenhouse force have been concerned with usual routine, also with several difficult changes. The hardy water-lilies were replanted in the excellent new concrete tank and tubs provided for them under Mr. Corbett's direction. Nearly all the plants of house 4 Range 1 were removed, renovated, and replaced pending the repairs to the roof. The orchids in house 6A, Range 2, were placed in the other orchid house and the extensive bromeliad collection returned there for display. This collection had been renovated at the Propagating Houses. 1,500 plants including 323 Chrysanthemums, 120 Cinerarias, 100 Primulas, 300 Begonias, 150 Pelargoniums, 200 Fuchsias, 150 Hippeastrums, 68 Hydrangeas, and 80 Solanums were growng for exhibition in the Central Display House. The feature exhibition was again the Chrysanthemum show, the 60 varieties given by Elmer D. Smith & Co., Adrian, Michigan, being especially fine this year. An increasing number of seedlings were raised for the systematic collection, for the Rock Garden, for the Flower Gardens, and for the Nurseries, as well as plants for Dr. Small's studies of native irises, for Dr. Stout's researches, and several thousand bedding plants.

SYSTEMATIC PLANTATIONS

Herbaceous Grounds. Dr. E. B. Southwick and Mr. Percy Wilson have added 550 species of plants to the herbaceous collection this year, through seeds, gifts, and collections, these distributed over about 75 families. With these additions, this collection now contains about 1,250 species; these, added to those of the Rock Garden and the Flower Gardens and Nurseries, give the Garden a collection of nearly 3,000 species of herbaceous plants.

Woody Collection. 70 species of hardy woody plants new to our collections were raised from seed this year, increasing the plants in nursery available for these collections by about 370 plants.

Conservatories. About 22,964 plants are now in our greenhouse collection, including 8,352 at Range 1, 9,048 at Range 2, and 5,564 at Propagating Houses. 80 varieties of water-lilies, 280 plants, were shown in the Conservatory Court.

MISCELLANEOUS COLLECTIONS

Rose Garden. 200 hybrid tea roses and 25 polyanthas on half standards were given to the garden this spring by Bobbink & Atkins, of Rutherford, N. J. The Rose Garden now contains 4,500 plants, 270 varieties.

Dahlia Garden. 462 varieties represented by 992 plants were grown in the Dahlia Border, under the direction of Dr. M. A. Howe.

Iris Garden. The Iris collection contains now about 1,400 varieties. 869 sorts were planted in the new alphabetical planting, 56 varieties of the Japanese kinds were spread over six new display beds, and 40 varieties of beardless irises were sorted out into four new beds. Mrs. W. H. Peckham and Mr. John C. Wister supervised the planting, which was carried out under specifications of the American Iris Society.

Narcissus Collection. The Dutch Bulb Exporters' Association donated to the Garden a collection of Narcissus numbering 37,000. This gift, together with other kinds given by Mrs. W. H. Peckham and purchased through the new Narcissus fund gives a display for 1925 of some 47,000 daffodils, 130 varieties, in massed and naturalistic planting. Mrs. W. H. Peckham planned and supervised this planting and gave other varieties, unsuitable for this location, to the Rock Garden.

Hyacinth Display. 6,000 hyacinths, in 6 varieties, were given also by the Dutch Bulb Exporters' Association. These were planted along the terrace east of Conservatory Range 1, where a great show is expected in the spring.

Gladiolus Collection. Mr. A. E. Kunderd, of Goshen, Indiana, presented 81 varieties of his Gladioli to replenish our collection, 47 of these varieties being new to the collection. The whole gift amounted to 4,100 bulbs.

Variegated Plant Collection. 62 varieties, 500 plants, were displayed in the variegated plant bed.

Hardy Chrysanthemum Collection. 65 varieties, 650 plants, were grown for this display. An increasing interest in this collection was shown by people all over the country.

Peony Collection. 87 plants, 40 varieties, were added to the peony plantation, which now contains 166 varieties, 427 plants.

Lily Garden. 260 bulbs were added to the lily garden, grown by Dr. Stout from seed or given by Mrs. Mortimer J. Fox.

Lilac Garden. The Lilac collection consists of 560 plants of 185 named varieties.

Canna Collection. 1,500 plants, 58 varieties, were displayed in the canna collection.

Tulip Display. 42,000 tulips were sorted out and planted in the Conservatory Court for a display in the spring of 1925, more than 100 varieties being kept.

Rock Garden. 600 species of plants were set out in the Rock Garden in 1924 under the direction of Dr. E. B. Southwick. Mrs. W. H. Peckham, presented this collection with about 1,200 bulbs, of Narcissus, Crocus, Scilla, and 19 other genera. These, together with other plantings donated by Mrs. M. H. Allen, Mr. Clarence Lown, and others, greatly increased the size and scope of the Rock Garden.

LABELING, RECORDING AND HERBARIUM

Under the direction of Mr. John Hartling, Head Gardener's Assistant, with one label boy, a total of 4,173 labels have been made and placed, including 193 for the Fruticetum, 492 for the Arboretum, 352 for the Pinetum, 206 for the Horticultural Grounds, 390 for Herbaceous Grounds, 314 for Iris Garden, 79 for Rock Garden, 10 for Lily Garden, 45 for Variegated Garden, 315 for Conservatory Range 1, 366 for Conservatory Range 2, 388 for Conservatory Beds, 275 for Dahlia Border, 382 for Rose Garden, 93 for Lilac Garden, 107 for Conservatory Court, 122 for Roads and Paths, 27 for Experiment Garden. 196 labels were repaired, 2,200 pot labels painted, 3,000 labels made for stock, and 24 signs were painted. Mr. Percy Wilson has accessioned, labeled, and booked 2,500 numbers for the Herbaceous Grounds and Rock Garden, and helped us with the tree, shrub, and greenhouse labels. Other accession numbers 52,460 to 54,814 have been recorded, making a total of 2,354 accessions for the year. 3,740 packets of seed, 73 by gift, 2,700 by exchange, 653 by purchase, 314 by collection were received. 56,175 bulbs were received, and 4,575 plants; of the latter 1,685 were gift, 587 by purchase, 479 by collection, 680 by exchange, and 1,144 from seed. 150 specimens were added to the herbarium of cultivated plants.

This department has collected material for schools, nature study, and college classes in botany.

LECTURES

I have delivered 8 lectures in regular courses, and have demonstrated our collections of shrubs and evergreens to students of horticulture from Columbia University and to other classes.

Respectfully submitted,
KENNETH R. BOYNTON,
Head Gardener

REPORT OF THE DIRECTOR OF THE LABORATORIES

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to submit the following report for the year 1924.

GENERAL MATTERS

The routine duties relative to such matters as meteorological records, conferences of the Garden Staff, lectures, and assistance rendered to students have been performed. In these, as in the investigational work, Miss Hester M. Rusk has rendered efficient assistance. Mrs. Jean Kerr has continued to assist in certain of the experimental studies. Plans have been made for the immediate construction of eight sashes of cold frames to afford facilities for growing the increasing number of seedling lilies. This is possible through the continued financial support of Mrs. Mortimer J. Fox to the project of breeding lilies. I wish to recommend that electrical connection be provided either at the Propagating House or at the present Laboratories, preferably at the latter place. This will allow the installation of constant temperature chambers for the germination of pollen—an im-

portant phase of the study of sterilities for which our present equipment is inadequate.

INVESTIGATIONS

My personal researches and those of students under my direction continue to be devoted chiefly to studies (1) of bud variation in special reference to mosaic diseases and (2) of the phenomena of sterility and fertility. In several cases the same plant affords material for both lines of investigation.

In *Coleus, Pelargonium, Abutilon,* and *Ligularia* very definite evidence is being obtained relative to the infectious nature of the mosaic and of its transmission in vegetative propagation and in seed progenies. In the two plants last mentioned the sterility from self-incompatibility has in the past limited the study of seed progenies.

For the study of sterility and fertility, cultures of *Lilium, Hemerocallis, Pelargonium, Brassica, Lythrum,* and sweet potato have continued to yield important results. In *Hemerocallis,* hybrids of numerous crosses have bloomed. Some of these are decidedly new and beautiful in flower coloring and worthy of general garden culture. Arrangements were made with Mr. Bertrand Farr, shortly before his death, for the propagation, naming, and distribution of the best of these daylilies in coöperation with the Wyomissing Nursery Co. The investigations with various species of *Lilium* in coöperation with Mrs. Mortimer J. Fox are progressing along the lines already defined and reported to you. A preliminary report on "Seedling lilies" appeared in the July number of our *Journal.* The increasing numbers of lily seedlings demand so much space and time that the purchase of new bulbs has been almost discontinued. Already a considerable number of plants of our own rearing has been supplied for display planting.

With your permission, investigations have been continued away from the Garden as follows. Ten days during the summer were spent at Presque Isle, Maine, in continuing the study of sterilities of potatoes during which germination tests were made of 1,595 samples of pollen. A total of about six weeks during the spring and autumn were spent at the New York State Experiment Station at Geneva in the coöperative studies of sterility and in the breeding of grapes for seedlessness. Examination and germination tests were made of the pollen of 227 varieties and seedlings of various fruits. A careful study was made of the flower behavior of the Courtland apple, the Baldwin apple, and the Winter Nelis pear. Tests for self-fruitfulness were made for six species and twelve named varieties of the pear and for fifteen species and three named varieties of the apple. Some crossing in the work of breeding grapes was accomplished. It is the plan to prosecute vigorously these lines of research during the coming year. They promise to yield results of high scientific interest which are of value in horticulture.

Coöperation with the Oxford Paper Company in research with the genus *Populus* along lines approved by you has been undertaken as a new project. Mr. E. J. Schreiner was secured for this work and is spending much of his time at the Garden. The work is progressing rapidly. In respect to the Garden in particular, the work has involved the increase of our collection of living poplars and the assembling of a very complete herbarium of species and varieties of *Populus* with also over 100 splendid pictures.

STUDENTS AND SCHOLARS

During the year the following persons have been formally registered for research at the Garden:

Carmen, Joseph, Plant Breeding and Pathology.
Degener, Otto, Systematic Botany.
Gaiser, Lulu O., Cytology.
Keck, David D., Plant Breeding.
Schreiner, Ernst J., Research with Populus.
Stauffer, John C., Biochemistry.
Swabey, Marjorie, Plant Breeding.
Varrelman, Ferdinand A., Plant Breeding.
Waller, Adolph E., Bibliography.
Wodehouse, Roger P., Studies with Pollen.

Respectfully submitted,

A. B. STOUT,
Director of Laboratories

REPORT OF THE BIBLIOGRAPHER

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to submit the following report for the year 1924.

The checking up and disposition of the large book-purchase from Geneva, mentioned in my last report, has occupied much of the time of the Bibliographer, as well as of the Librarian. This work is still far from completion, but the employment of special assistance during the latter part of the year has made possible much more rapid progress.

Within a few months will occur the twentieth anniversary of the appearance, in May, 1905, of the first part of *North American Flora.* Of the 34 volumes planned, half have been begun and one finished; the total number of pages issued is 4,376, an average of about 220 pages each year. Of the 54 parts, 26 are devoted to flowerless plants and 28 to flowering plants. Of the 99 families of plants thus far treated in whole or in part, 37 are families of cryptogams and 62 of spermatophytes. The work has always been done under the supervision of an editorial

committee, but all of the manuscript-revision, proof-reading, bibliographic correction, and other endless editorial detail, has been from the beginning delegated to the writer.

Of *North American Flora,* five parts have been issued during the year: volume 25, parts 4 and 5, in March; volume 24, part 4, and volume 7, part 9, in October; and volume 10, part 4, in November; several more parts of volume 7 are in press. The concluding number of volume 8, and three numbers of volume 9, of *Addisonia,* have been published.

In addition to the routine work pertaining to his office, the Bibliographer has given three lectures in the Garden courses on Saturday afternoons.

Respectfully submitted,
JOHN HENDLEY BARNHART,
Bibliographer

REPORT OF THE LIBRARIAN

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to submit the following report for the year 1924.

The census of the library recently taken shows a total of 33,636 bound volumes, a gain of 1,325 over the census of 1923. Of these there were acquired by gift 32, by exchange and deposit 20, and by purchase 49. In addition there have been accessioned during the year 581 bound and 122 unbound volumes of the Geneva collection purchased in 1923. There have been bound 585 volumes belonging to the Garden and 34 to Columbia University, while the rebinding has included 18 belonging to the Garden and New York Academy of Sciences and 12 to Columbia. No detailed account of the pamphlets accessioned has been kept but more than 300 treating in a popular manner of economic botany, forestry, horticul-

ture, and landscape gardening and a large number of more scientific articles by American and foreign authors have been fully catalogued and added to the collection.

The principal accessions have been listed as heretofore in the *Journal*.

There have been added to the catalogue 2,052 typewritten cards and 4,159 of those issued by the Torrey Botanical Club.

Two new folio cases have been added to the stack room and are already filled.

The following omissions and additions should be made to the list of serials as appended to the report of the Librarian for 1921 (*Bulletin* 12: 41–61) and supplemented in the report for 1922 (12: 139) and 1923 (12: 211, 212).

Omit the following:

Anales Cientificos Paraguayos: Botanica, Puerto Bertoni, Paraguay.
*Archiv für Zellforschung, Leipzig, Germany.
Arquivos Indo-Portugueses de Medicina e Historia Natural, Nova Gôa, India.
Lisbon. Instituto Bacteriologico Camara Pestana, Lisboa, Portugal. *Arquivos.*

Change the following:

Bulletin Joseph Pâquet, to Le Midi Horticole, Nice, France.
American Forestry to American Forests and Forest Life, Washington, D. C.

Add the following:

Czechoslovak Botanical Society of Prague, *Preslia.*
Dorpat. Jardin Botanique de l'Université, Dorpat, Esthonia. *Seed Lists.*
Folia Cryptogamica, Szeged, Hungary.
*Journal of Pomology and Horticultural Science, London, England.
Lithuania. Université. Faculté des Sciences, Kaunas, Lithuania. *Mémoires.*
Prague. University, Prague, Czecho-slovakia. *Studies from the Plant Physiological Laboratory.*
*Revue Algologique, Paris, France.
Société Botanique de Russie, Leningrad, Russia. *Journal.*
Tropical Agriculture, Trinidad, B. W. I.
*Zeitschrift für Zellen-und-Gewebelehre, Berlin, Germany.

Respectfully submitted,
SARAH H. HARLOW,
Librarian

REPORT OF THE SUPERINTENDENT OF BUILDINGS AND GROUNDS

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to submit the following report for the year 1924.

REGULATING AND GRADING

Considerable grading has been done in the Garden during the year. Both sides of the traffic road from 200th Street to the South Gate were graded, sodded, and sown with lawn-grass seed. The road leading to the Mansion from the main road was changed to a foot path, and in order to accomplish this it was necessary to grade and sod a gutter 10 feet wide and 150 long along the road. The two sides of the new path through the oaks in the arboretum were graded and the sides of the path leading from the Rose Garden to the Glen were sodded as well as graded. Nearly an acre of ground was sown with lawn-grass seed at the southeastern entrance along Pelham Parkway.

For many years contractors working in the vicinity of the Garden who were looking for a suitable place to dispose of soil taken from excavations have been carting such soil into the Garden. This year they brought in about 1,000 yards of this soil, at their own expense, and this was placed on the eastern bank of the Long Lake so as to help fill in the bottom of the valley.

DRAINAGE

A culvert was built under the path at the north end of the upper lake so as to catch the rain from the west drive, and two culverts and cross paths were built in the Rose Garden. The large culvert which takes the overflow from the ponds in the Herbaceous Grounds was widened for about 100 feet. A catch-basin was built, and 38 feet of

6-inch tile pipe were used to drain the corner of the new road near the stable.

WATER SUPPLY

A 6-inch connection to the 20-inch high-pressure water main was made near the Iris Garden at Pelham Parkway and two gate valves were used to make this connection. We are now connected with both the high- and low-pressure water mains, but have closed off the low-pressure main. At the present time there is a 20-pound water pressure at the Rock Garden, and a hose tap has been connected on this line in order to water the plants on the top of the hill. The fire hydrant on the west drive near the Museum Building which had been broken was replaced with a New York standard hydrant. All necessary repairs were made to the water system in the Museum Building and comfort stations as well as to the drinking fountains throughout the Garden.

PATHS

The new road on the eastern side of the Garden was completed by the Park Department and opened to the public. The northern part of the old road leading to the Mansion is being used as a foot-path only, and about 200 feet of this road was narrowed to a foot-path 10 feet wide. The 10-foot cross-paths were built at the connection of the new road with the cross roads. A 10-foot path 200 feet long was built from the Mansion path to meet the path leading from the Boulder Bridge. The 10-foot path 400 feet long at the southeastern entrance to the Garden, which was begun last year, has been completed and extended further north for a distance of 408 feet, with a branch path 50 feet long. The unfinished path 534 feet long in the climbing rose garden was also completed, as well as an unfinished path 10 feet wide and 220 feet long in the picnic grounds on the western side

of the Bronx River. The paths in the Iris Garden and those around the terrace and flower beds at Conservatory Range 1 were resurfaced and rolled, and all the paths in the northern part of the Garden were cleaned and resurfaced.

BUILDINGS

The window sashes and doors on the first and second floors of the Museum Building received two coats of paint, and the walls of rooms 35 and 55 on the top floor were repaired and painted. The roof of the Museum Building was covered with a coat of Supercote, which has stopped all the leaks, and considerable plastering was also done in the building. The carpenters made all necessary repairs to the windows and doors, and the steam and water systems were also repaired by our steam engineers.

All the glass and sash bars of the roof of house 4, Conservatory Range 1 were replaced and two coats of paint given to the entire house. Eight lines of 3-inch copper leader pipe 40 feet long were replaced. The benches of house 12 were replaced with concrete benches, two side benches 80 feet long and a double center bench. The painters replaced all the broken and loose glass at Conservatory Ranges 1 and 2. Repairs were also made to the sash-bars at the Propagating Houses and all broken glass was replaced there also.

The floors of the stalls at the stable were repaired. The fire boxes of the five boilers at Power House 1 were rebuilt and all needed repairs to the steam system were made. At Power House 2 the brickwork on boiler 7 was taken down and rebuilt, and necessary repairs to the steam system were made there also.

The heating systems of Conservatory Ranges 1 and 2 and the Propagating Houses were repaired by our steam engineers. The steam line running from Power House

1 to Comfort Station 2 under the Elevated Railway Approach was replaced with new pipe and the 4-inch steam pipe in the trench from Power House 1 to the Museum Building was also repaired.

The stone walls and all the brick partition walls of the Mansion have been taken down to the level of the first floor. All the stone, brick, window-frames, doors, and timbers are being stored away for future use. The stone will be used for boundary fences and paths, and the brick will be used to construct catch-basins and to make repairs throughout the grounds. The roof of Comfort Station No. 3 was reshingled and valleys, gutters, and leaders replaced.

GROUNDS

The floor of the hardy-waterlily tank in the court of Conservatory Range 1 was raised seven inches and forty-eight concrete tubs 15 x 30 x 30 inches were built therein.

The cedar fences at the Woodlawn Road Approach and along the Bronx River were repaired by the carpenters, as well as all the one- and two-rail iron fences throughout the grounds. Along the path going east from the Iris Garden Entrance and that running east of the Iris Garden road, 2,070 feet of a two-rail fence was built. Another two-rail fence, 3,457 feet long, was built from the southern end of the Boulder Bridge through the Hemlock Grove. At the southern end of the Herbaceous Grounds and east of the Rock Garden, 1,100 feet of a $1\frac{1}{4}$-inch one-rail fence was put up. On the eastern side of the main road running north from the Southern Boulevard Entrance, 117 feet of a 1-inch one-rail fence was also built. Along the path from the Southern Boulevard Entrance gate to Conservatory Range 1, 380 feet of a $\frac{3}{4}$-inch one-rail fence was put up and another fence 340 feet long was built along the path west of Conservatory Range 1. All of the above-named iron fences received

two coats of paint, and 1,200 feet of the high iron fence at the Fordham College boundary received two coats of paint also.

Along Pelham Parkway east of the Bronx River, eleven stone piers 8 feet high, with caps, and 278 feet of a rubblestone wall 18 inches high, with coping stone, were constructed. East of the Iris Garden Road, along Pelham Parkway, five piers 8 feet high, with caps, and 126 feet of a rubblestone wall 18 inches high with coping stone were also put up.

Repairs were made to five rustic benches, and the signs and maps placed around the grounds were repaired and replaced wherever necessary. The wood cut from dead and fallen trees supplied the Propagating Houses with wood fuel for four and a half months. Nearly sixty tons of hay were cut and the uprooting of poison ivy was continued.

About a dozen picnics a week, averaging from about 50 to 1,000 children, visited the Garden from May until September. These children were from the public and Sunday Schools throughout Greater New York and New Jersey, and were escorted to the picnic grounds set aside for these parties by our special guards who were detailed there daily.

From May until October two police officers in civilian clothes were stationed in the Garden. On Saturdays, Sundays and holidays four additional uniformed police officers were assigned to the Garden. In addition to our own keepers, twelve guards were selected from the laborers and gardeners who patroled the Garden on Sundays and holidays. A city officer was detailed here every day during the past year. About 275 summonses were served by the police officers for violations of park ordinances. The offenders were fined from two to twenty-five dollars by city magistrates.

During the summer months, on Saturdays, Sundays, and holidays, the visitors to the Garden averaged about 50,000, which number was greatly augmented during July and August.

Little damage was done to the plantations, because of the watchfulness of our employes. Special guards were assigned to the rose, gladiolus, and dahlia collections all night long as well as in the day time, as the number of admirers is constantly increasing.

Respectfully submitted,

ARTHUR J. CORBETT,

Superintendent of Buildings and Grounds

REPORT OF THE HONORARY CURATOR OF THE ECONOMIC COLLECTIONS

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to submit the following report of the Economic Collections for the year 1924.

There is little of a special nature to report in the work of the Economic Museum for the past year, activity having consisted chiefly in attention to routine procedures. Some specimens have been renewed and the labels of many others have been corrected or modified in the light of fuller information. About fifty exhibits have been added. The most important of these is a complete set of cultivated blueberries donated by Miss Elizabeth G. White, of New Lisbon, N. J. Since the founding of the Museum, our native blueberries and huckleberries have received close attention. Our collection of these fruits, though by no means complete, is large and interesting, and the addition of fine specimens of all the named cultivated varieties is an important contribution. The clusters of these berries are as large as small bunches of grapes, and some of the individual berries measure an inch in cross-section.

The classification of the general botanical collections of the Mulford Exploration is now about completed, a result that will make it practicable to study more definitely the economic collections of that expedition, a work to which attention will be directed during the coming year. For that year, also, is planned an extensive collecting trip to Nova Scotia and the country to the northward, a section particularly rich in edible wild berries and berry-like fruits. Here, we are expecting to secure a number of articles which have been desiderata for many years.

Respectfully submitted,
H. H. RUSBY,
Honorary Curator of the Economic Collections

REPORT OF THE PALEOBOTANIST

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to report as follows upon paleobotanical matters which have received my attention during the year 1924.

From February 1st to June 30th I was in Washington, D. C., on leave of absence, engaged in work on the fossil flora of Alaska for the U. S. Geological Survey.

In January, previous to departure, I completed the final editing of the manuscript of the fossil flora of the West Indies and submitted it for publication. I also finished the last few items that required attention in connection with the joint work with Professor E. W. Berry of Johns Hopkins University, on a fossil flora from Brazil. Each of these works was issued during the year—the former under the title, "A Review of the Fossil Flora of the West Indies, with Descriptions of New Species," and the latter as, "A Late Tertiary Flora from Bahia, Brazil."

From the time of my return, in July, until the end of the year, the principal item of investigation was con-

cerned with the Pleistocene flora of the Kootenay Valley, British Columbia, in connection with specimens transmitted by the Canada Geological Survey. A large shipment of this material was received during the year, additional to that previously received and reported upon. About one hundred specimens (Lot No. 30, Acc. No. 13) will be added to the Museum collection from this source.

We also received—a gift from Senor Don Narciso Rabell, of Porto Rico—a collection of about thirty specimens (Lot No. 29, Acc. No. 12) of fossil plant remains, presumably of Tertiary age, from the vicinity of the Collazo River.

I also received, examined, and reported upon a specimen of sandy peat containing fragments of wood and other plant remains (Lot No. 31, Acc. No. 14), found in an excavation in lower Manhattan; and a specimen of baked shale containing plant remains (Lot No. 32, Acc. No. 15) from La Brea, Trinidad, W. I.

Accessions of paleobotanical literature were unusually numerous—for the most part representing exchanges. Forty-five separates were received from nineteen different authors, four of whom were not previously represented on our exchange list. Eight accessions were also received as gifts.

On request of Professor H. Ries, of Cornell University, a series of ten specimens of silicified wood, mostly from the West Indies, was selected from duplicate material in the Garden collection and transmitted for research work.

In connection with the public lecture courses it was my privilege to give one on August 30th, on "The Hudson River Valley before the Advent of Man," and one on November 29th, on "The Geology of the New York Botanical Garden."

Abstracts of all my geological and paleobotanical papers published during the year were prepared and transmitted to the *Revue de Géologie*.

Respectfully submitted,

ARTHUR HOLLICK,
Paleobotanist

REPORT OF THE HONORARY CURATOR OF MOSSES

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: Additions to the collections of mosses have been received from Professor L. H. Bailey, of Ithaca, N. Y., and Dr. John W. Bailey, of Washington. E. H. Bartram has sent some interesting specimens from Arizona and New Mexico. Professor J. M. Holzinger has contributed fascicle 21 of his exsiccatae and Dr. George E. Nichols duplicates of his mosses of Michigan. Brother León has continued his Cuban exchanges, and some notable species of our collections in Porto Rico have been added. The National Museum in Washington has sent us all their mosses for naming, and as many of them are Central and South American species, Mr. Williams has studied and named them, as well as the miscellaneous small packets that come from members of the Sullivant Moss Society, of which he has served as president during the year.

My own time has been largely spent in conservation work, having been called upon for illustrated articles for the Rural School Leaflets, the Girl Scouts, and other similar organizations. Recently I have been appointed Chairman of the Conservation Committee of the Federated Garden Clubs of New York State. I have also visited a number of the local garden clubs and given illustrated lectures at Trenton, Bedford, etc. A keen and growing interest in the replanting of Fringed Gentian and Holly was aroused and Dr. Stout and Dr. Norton have supplied seeds and information.

From the Stokes Fund a series of colored lantern slides have been added to the collection and a Holly postal card has been distributed. It reads as follows:

MERRY CHRISTMAS!

Save your Holly berries and plant them at once in pots.
Have your own Holly trees and some to give your friends.
There will soon be no more Holly unless we all help.

NEW YORK BOTANICAL GARDEN
STOKES FUND FOR THE PRESERVATION OF
NATIVE PLANTS.

It was illustrated with photograph of small plants in pots. The demand for this card has been so great that we shall have to reproduce it again this year.

Respectfully submitted,
ELIZABETH G. BRITTON,
Honorary Curator

REPORT OF THE HONORARY CUSTODIAN OF THE LOCAL HERBARIUM

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor of presenting herewith my report for the year 1924 as Honorary Custodian of the Local Flora Herbarium.

The work of arranging the mounted sheets systematically has been carried on, as in the two years just preceding, chiefly by Mrs. William Mitchell; and is now finished. It is now a simple matter to find in a moment the specimens in our local collection from any of the sixty-one counties in our local area. The plotting of the distribution on small-scale maps, one for each species, has now begun.

Additions to the Local Herbarium have been made to the extent of about 900 sheets, chiefly from material col-

lected on the longer Torrey Club trips and, during the summer, by the Custodian. There are also collections by Mr. Percy Wilson and Mr. W. C. Ferguson which have not yet been examined and counted.

Respectfully submitted,
H. M. DENSLOW,
Honorary Custodian

REPORT OF THE CHAIRMAN OF THE SCIENTIFIC DIRECTORS

TO THE BOARD OF MANAGERS OF THE NEW YORK BOTANICAL GARDEN.

Gentlemen: The Scientific Directors have held their regular meetings throughout the year and have considered many routine matters relating to the scientific work of the Garden. The full account of the scientific, educational, and other activities of the Garden is given in the report of the Director-in-Chief and I need mention only a few points for special emphasis.

The form of the Garden *Journal* has been changed and an effort is being made to present scientific material of particular interest to the Garden members.

Dr. Gleason's work during the summer in the great herbaria of London and Paris has notably advanced our knowledge of the collections of South American plants brought together by recent Garden and other explorations.

The large and varied series of fungi obtained by Dr. Murrill on his South American trip has markedly enriched our material in this field. This collection includes types and other important specimens from Spegazzini who has been a life-time student and collector of South American fungi.

Dr. Stout's work on problems concerned with seed production in potatoes has been brought to a stage of ap-

proximate completion with the development of evidence that, with due regard for compatibility in the selection of pollen parents, tuber production and seed production do not necessarily tend to mutually inhibit each other. Dr. Stout has also taken up advisory work in connection with certain projects for growing pulp-wood which promise the opportunity for study on a large scale of problems of tree growth, especially in connection with the possibility of utilizing hybrids.

In connection with the plans for enlarging the support of the Garden, which are now under consideration, the Scientific Directors, at the suggestion of the President, have spent some time in the consideration of matters related to the more adequate development of the Garden's research work. On the basis of this study and after full discussion they have formulated plans for enlarging the work of the Garden in various lines which its location, its present equipment, and collections, and its relation to the City suggest as timely. These plans are embodied in a report which is here submitted for filing in the records of the Board of Managers, and will ultimately be distributed in printed form.

Many of the fields of work here suggested have been long discussed and agreed upon. The need of adding a pathologist to the Garden staff has been long recognized. The protection of our existing floral and forest plantations as well as those extensions for which we are planning makes absolutely necessary the employment of experts, who can advise and direct our floriculturists and gardeners on the numerous problems of fungus and insect pests with which they are confronted, and by which our plantations are now in a number of cases seriously menaced.

It is noteworthy in this connection that with the pressure of work on the diseases of our great agricultural and horticultural crop plants, the diseases of ornamen-

tals in general, and the diseases of park and other municipal decorative plantations have been largely and in many cases wholly neglected by our state experiment stations. If our pathological service is to be effective, the establishment of a well-planned research organization is a necessity and we have recommended in the report that the work of the Garden be extended to cover this field.

The normal activities of a great botanical garden in maintaining collections of plants representing adequately the native vegetation of the earth afford very unusual opportunities for fundamental studies of the relations of heredity and environment, and all the other problems whose present day importance the new science of genetics is so strongly emphasizing. The great floricultural collections, which bring together from all over the world the latest products of the breeder's art, as well as maintaining the earlier types for comparison, are not only of great service to dealers and growers as a means of certifying what is genuinely new and distinctive, but constitute invaluable material for the studies of the geneticist. The cost of bringing together and maintaining such collections can be met in no other way more advantageously than by utilizing their artistic and educational value in a botanical garden and park system. We are recommending provision for the fuller utilization in research of the materials in this field which are already so well represented in the Garden.

The maintenance for the future of the native forest trees of the Garden and its hemlock grove, under the increasingly intensified city conditions by which the Garden is surrounded, lays an especial duty upon us to study the very numerous unsolved problems relating to the soil and atmospheric conditions which affect the life of trees as well as other vegetation. We have already begun in a limited way a study of the climatic conditions which

characterize the regions in which the hemlock forms natural forest growths. We are recommending the provision for more intensive studies of many problems of tree feeding, of atmospheric pollution, and of soil moisture and aëration.

The New York Garden is unusually diversified in its topography and presents a very wide range of conditions as to soil depth and quality, exposure, drainage, and soil and air moisture. This diversity of habitats is well adapted to the purposes of a botanical garden. No other garden in the world is more favored in its natural location. This situation brings with it unusual opportunities for a wide study of soils in their relations to root growth and plant nutrition, and we have outlined a number of problems in this field. The microscopic organisms found in soils are known to have very important relations to soil fertility but, with the exception of a few groups, have been little studied. The great collections of algae and fungi in the Garden herbarium will be very useful in the study of these soil organisms.

The Scientific Directors, in preparing this report, have further felt that The New York Botanical Garden has a part to play in the development of the newer phases of experimental plant science. There are fundamental problems of disease which can be more effectively attacked on plant materials than on any others. The germ diseases, whether of plants or animals or man, form one common group in many of their fundamental relations to the living organism. Such problems as those presented by individual immunity and its inheritance; the problems of epidemiology and many others, are the same throughout the plant and animal kingdom and can be attacked more directly in many cases on plant material.

There are fundamental long-time problems as to the growth and reproduction of trees on which the success of forestry practice and reforestation must depend, which

an endowed institution like the Garden with its continuity of organization can especially well attack. It is our opinion that this is also true of many problems in all the fields of work outlined in our report.

Respectfully submitted,

R. A. HARPER,

Chairman, Scientific Directors

SCHEDULE OF EXPENDITURES DURING THE YEAR 1924

1. City Maintenance Account

Salaries Regular Employees

Appropriated		$142,839.00
Expended		142,709.83
Balance		129.17

Wages Temporary Employees

Appropriated		12,796.80
Expended		12,796.80

Forage and Veterinary Supplies

Appropriated		373.00
Expended		373.00

Fuel Supplies

Appropriated (Budget Acc.)	$ 25,000.00	
Appropriated (Revenue Bond Acc.)	4,400.00	
Total		29,400.00
Expended (Budget Acc.)	24,997.75	
Expended (Revenue Bond Acc.)	4,399.40	
Total		29,397.15
Balance		2.85

Office Supplies

Appropriated	300.00
Expended	298.14
Balance	1.86

General Plant Supplies

Appropriated	1,000.00
Expended	998.71
Balance	1.29

General Plant Equipment

Appropriated	1,000.00
Expended	999.71
Balance	.29

General Plant Materials

Appropriated	$ 2,300.00
Expended	2,297.48
Balance	2.52

Repairs and Replacements

Appropriated	26,300.00
Expended	26,298.90
Balance	1.10

Light Heat and Power

Appropriated	350.00
Expended	317.32
Balance	32.68

Shoeing and Boarding Horses including Veterinary Service

Appropriated	150.00
Expended	147.00
Balance	3.00

Telephone Service

Appropriated	195.00
Expended	158.94
Balance	36.06

Summary—City Maintenance Account

Appropriated (Budget Acc.)	$212,603.80	
Appropriated (Revenue Bond Acc.)	4,400.00	
Total		217,003.80
Expended—Salaries and Wages	155,506.63	
Expended—Sundry Expenses	61,286.35	
Total		216,792.98
Balance		210.82

2. Special Garden Accounts

Plant Fund

Balance from 1923		$ 241.25
Contributions		395.00
Sale of plants	25.00	
Sale of hay	45.00	
Total		$ 706.25
Expended—Lily bulbs	106.56	
Expended—Narcissus bulbs	355.50	
Expended—Sundry items	164.61	
Total		626.67
Balance		79.58

Special Book Fund

Balance from 1923	102,76	
Contributions	4,695.00	
Sale of duplicate books	527.85	
	5,325.61	
Transferred to Publication Fund	650.00	
Total		4,675.61
Expended—Books	4,372.65	
Expended—Supplies	184.90	
Total		4,557.55
Balance		118.06

Exploration Fund

Balance from 1923	16.14	
Contributions	1,550.00	
Refund	6.77	
Total		1,572.91
Expended—Exploration	1,432.06	
Expended—Supplies	99.81	
Total		1,531.87
Balance		41.04

Museum and Herbarium Fund

Balance from 1923	26.01

Contributions	$ 1,660.00	
Sale of paper	15.00	
Total		$ 1,701.01
Expended—Specimens	248.30	
Expended—Supplies	1,441.63	
Total		1,689.93
Balance		11.08

SPECIAL DEVELOPMENT FUND

Balance from 1923	185.81	
Contributions	175.00	
Total		360.81
Expended—Cold frames	28.79	
Expended—Supplies	56.45	
Total		85.24
Balance		275.57

PUBLICATION FUND

Balance from 1923	31.35	
Contributions	2,650.00	
Transferred from Special Bond Fund	650.00	
Total		3,331.35
Expended		3,319.37
Balance		11.98

LABORATORY FUND

Balance from 1923	228.91	
Contributions	125.00	
Total		353.91
Expended—Apparatus and Supplies		333.18
Balance		20.73

INVESTIGATION FUND		
Balance from 1923		$ 4.94
Contributions		1,595.00
Refund		7.60
Total		$ 1,607.54
Expended—visits to other institutions	1,187.16	
Expended—Sundry items	330.65	
Total		1,517.81
Balance		89.73
LECTURE FUND		
Balance from 1923	8.82	
Contributions	250.00	
Sale of lantern slides	26.80	
Total		285.62
Expended—Lecture fees	60.00	
Expended—Lantern slides	11.50	
Expended—Printing	204.00	
Total		275.50
Balance		10.12

3. SPECIAL INCOME ACCOUNTS

Science and Education Fund		
Appropriated for Public Instruction		4,500.00
Expended—Salaries	3,170.00	
Expended—Investigation	200.00	
Expended—Supplies	891.05	
Total		4,261.05
Balance		238.95

Darius O. Mills Fund

Appropriated for painting and drawing of plants		$2,500.00
Expended—Salaries	$ 1,400.00	
Expended—Supplies	21.85	
Total		1,421.85
Balance		1,078.15

Henry Iden Fund

Appropriated for Books	500.00
Expended	22.06
Balance	117.94

William R. Sands Fund

Appropriated for Publications	800.00
Expended	779.79
Balance	20.21

Olivia E. and Caroline Phelps Stokes Fund

Appropriated for the Preservation of Native Plants	200.00
Expended—Colored lantern slides	88.95
Balance	111.05

Students Research Fund

Appropriated for aid for Students' Research	700.00
Expended—Scholarships	225.00
Balance	475.00

David Lydig Fund

Appropriated for Publications	4,000.00
Expended	3,976.33
Balance	23.67

Addison Brown Fund

Appropriated for Publication of Addisonia	3,000.00
Expended	2,900.75
Balance	99.25

John Innes Kane Fund		
Appropriated for plants for the grounds and green houses		$ 500.00
Expended		489.40
Balance		10.60
Maria DeWitt Jesup Fund		
Appropriated for the Increase of the Collections		1,200.00
Expended—Books	$724.20	
Expended—Specimens	181.53	
Expended—Plants	197.24	
Total		1,102.97
Balance		97.03
Charles Budd Robinson Fund		
Appropriated for Aiding Exploration		100.00
Expended		.....
Balance		100.00
Fanny Bridgham Fund		
Appropriated for Books and Binding Books		1,600.00
Expended—Binding books		1,243.35
Balance		356.65
Francis Lynde Stetson Fund		
Appropriated for Lectures and Lantern slides		1,200.00
Expended—Lectures	1,075.56	
Expended—Lecture slides	118.55	
Total		1,194.11
Balance		5.89
Russell Sage and Margaret Olivia Sage Fund		
Labor		
Appropriated		22,000.00
Expended		21,823.80
Balance		176.20

Fencing and Railings		
Appropriated		$ 6,000.00
Expended		5,311.29
Balance		688.71
Salaries		
Appropriated		16,550.00
Expended		16,538.30
Balance		11.70
Architects and Engineers		
Appropriated		2,450.00
Expended		1,065.00
Balance		1,385.00
New Stable Equipment		
Appropriated		2,000.00
Expended		1,571.94
Balance		428.06
Additional Library Shelving		
Appropriated		1,000.00
Expended		929.00
Balance		71.00
Summary—Sage Fund		
Total Appropriated		50,000.00
Expended—Salaries and Labor	$38,362.10	
Expended—Other items	8,877.23	
Total		47,239.33
Balance		2,760.67

4. General Income Account

Insurance

Appropriated		1,945.00
Expended—Museum specimens and Library	1,891.51	
Expended—Elevator	38.50	
Total		1,930.01
Balance		14.99

Entertainment of Guests and Meetings of Members	
Appropriated	$ 700.00
Expended	697.35
Balance	2.65
Assistance for Treasurer	
Appropriated	1,200.00
Expended	1,200.00
Circulars for Membership	
Appropriated	845.00
Expended	841.28
Balance	3.72
Temporary Subsidy for "Addisonia"	
Appropriated	800.00
Expended	650.00
Balance	150.00
Contingent Fund	
Appropriated	1,885.00
Expended	1,880.69
Balance	4.31
Salaries	
Appropriated	16,000.00
Expended	15,974.37
Balance	25.63
Expenses—Honorary Curator of the Economic Collections	
Appropriated	600.00
Expended	600.00
Supplies and Materials	
Appropriated	5,225.00
Expended	5,216,85
Balance	8.15

Summary—General Income Account

Appropriated		$ 29,200.00
Expended—Salaries	$ 15,974.39	
Expended—Services and Expenses	1,800.00	
Expended—Other items	11,216.18	
Total		28,990.55
Balance		209.45

5. GRAND SUMMARY

Contributions, Appropriations, Etc.

City Maintenance Account			
Appropriated			217,003.80
Special Garden Accounts			
Balance from 1923	$ 845.99		
Contributions	13,095.00		
Sales and Refunds	654.02		
		14,595.01	
Special Income Accounts			
Appropriated		70,800.00	
General Income Account			
Appropriated	29,200.00		
Total Garden Funds			114,595.01
Grand Total			331,598.81

Expenditures

A. *Accounts*			
City Maintenance		216,792.98	
Special Garden	13,937.12		
Special Income	64,944.07		
General Income	28,990.55		
Total Garden Funds		107,871.74	
Grand Total			324,664.72

B. *Distribution*

Salaries and Labor		$214,413.10
Services and Expenses		3,090.00
Insurance		1,930.01
Construction		5,311.29
Light and Heat		29,714.47
Supplies, Equipment and Materials		17,006.03
Repairs and Replacements		26,298.90
Plants, Books and Specimens		8,014.59
Exploration, Investigation and Lectures		4,377.78
Publications		11,626.07
Contingencies	2,882.48	
Total		$324,664.72

Respectfully submitted,
WALTER S. GROESBECK,
Bookkeeper.

E. and O. E.
NEW YORK, JANUARY 12, 1925.

DIRECTOR-IN-CHIEF'S ACCOUNT FOR THE YEAR 1924

466 Lexington Avenue
New York, April 7, 1925

MR. ROBERT W. DE FOREST,
Chairman, Finance Committee, New York Botanical Garden,
30 Broad Street, New York, N. Y.

Dear Sir:

This is to certify that I have examined and audited the financial books and accounts of the Director-in-Chief of The New York Botanical Garden for the year nineteen hundred and twenty-four (1924), and that I find the same to be correct, and the cash balance to be as stated in the current cash book.

In accordance with recent practice, I have not included in the auditing the examination of the vouchers for City maintenance or construction work paid for by the City, as such vouchers have been found proper and in order by the City authorities, and it was decided in 1904 by the then Chairman of the Finance Committee that a further examination of them was unnecessary.

By like authority I have omitted also a detailed examination of the annual membership dues account. These dues are received by the Director-in-Chief and forwarded by him to the Treasurer, the former keeping a detailed record of the same.

Respectfully submitted,
A. W. STONE,
Special Auditor

REPORT OF THE COMMITTEE ON PATRONS, FELLOWS AND MEMBERS FOR THE YEAR 1924

To the Board of Managers of The New York Botanical Garden.

Gentlemen: The number of new members who have qualified is 177. The number of annual members is now 1,416; life members 123; sustaining members 18.

Of the annual members 53 are now in arrears for dues for 1924, 25 for dues for 1923 and 1924, 16 for dues for 1922, 1923 and 1924.

Dues have been collected to the amount of $13,945.

One person has qualified as a fellow for life by the payment of $1,000, and one person as a life member by the payment of $250. These sums have been transmitted to the treasurer.

A complete list of all classes of members to date is herewith submitted.

Benefactors

*Mrs. Fanny Bridgham,
*Hon. Addison Brown,
*Andrew Carnegie,
Columbia University,
*Hon. Charles P. Daly,
Daniel Guggenheim,
Murry Guggenheim,
*D. O. Mills,
*J. Pierpont Morgan, Sr.,
John D. Rockefeller,
*Mrs. Russell Sage,
*Francis Lynde Stetson,
*Cornelius Vanderbilt.

Patrons

Oakes Ames,
*Miss Catherine A. Bliss,
Dr. N. L. Britton,
*Hon. Addison Brown,
*Andrew Carnegie,
*Mrs. George Whitfield Collord,
*Mrs. Louisa Combe,
*James M. Constable,
*William E. Dodge,
James B. Ford,
*George J. Gould,
Edward S. Harkness,

* Deceased.

*Mrs. Esther Herrman,
Archer M. Huntington,
*Henry Iden,
Mrs. John Innes Kane,
*John Stewart Kennedy,
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Mrs. Seth Low,
James B. Lowell,
Mrs. Clarence M. Lowes,
Albert E. Lownes,
Dr. Alzamon Ira Lucas,
C. G. Lueder,
E. L. Lueder,
William M. Lybrand,
J. M. Richardson Lyeth,
Miss Grace G. Lyman,
James B. Mabon,
John F. MacEnulty,
Clarence H. Mackay,
Kenneth K. Mackenzie,
Mrs. Charles F. MacLean,
V. Everit Macy,
F. Robert Mager,
J. H. Maghee,
Dr. M. O. Magid,
Miss Helaine Magnus,
Mrs. Robert Mallory, Jr.,
L. William Malone,
Dr. Morris Manges,
J. G. C. Mantle,
Mrs. H. Edward Manville,
Miss Delia W. Marble,
John Markle,
Mrs. John Markle,
Alfred E. Marling,

Otto Maron,
Mrs. Allan Marquand,
Mrs. Henry Marquand,
John B. Marsh,
R. W. Martin,
Walter R. Marvin,
C. N. Mason,
William J. Matheson,
H. W. Maxwell,
George O. May,
Harry Mayer,
Mrs. R. de L. Mayer,
Dr. D. H. McAlpin,
George McAneny,
Dr. George C. McBride,
T. T. McCabe,
W. Peck McCaffray,
George V. A. McCloskey,
Henry Forbes McCreery,
Lloyd G. McCrum,
Mrs. Alfred McEwen,
Mrs. John R. McGinley,
Mrs. Robert T. McGusty,
Edward A. McIlhenny,
Tompkins McIlvaine,
Mrs. Charles W. McKelvey,
Henry P. McKenney,
John A. McKim,
W. A. McLaren,
Mrs. James McLean,
Edward F. McManus,
Mrs. Clarence F. McMurray,
William McNair,
B. Frank Mebane,
Mrs. T. M. R. Meikleham,
Morton H. Meinhard,
Mrs. S. Stanwood Mencken,
Mrs. William R. Mercer,
Miss Marguerita Mergentime,
Henry H. Merriam,
Miss Ella J. Merrifield,
John L. Merrill,
I. J. Merritt,
William F. Meschenmoser,
Herman A. Metz,
Arthur S. Meyer,
Charles G. Meyer,
Eugene Meyer, Jr.,
Mrs. Albert G. Milbank,
John G. Milburn,
W. W. Miller,
Miss Mary G. Millett,
Mrs. Regina V. G. Millhiser,
M. F. Millikan,
Mrs. Gerrish Milliken,
Dr. Adelaide Mills,
Grafton W. Minot,
Alexander S. Mitchell,
Mrs. Clarence B. Mitchell,
Mrs. John Murray Mitchell,
R. Milton Mitchill, Jr.,
Mrs. John H. Mohlman,
H. de la Montagne, Jr.,
Carleton Montgomery,
Mrs. H. E. Montgomery,
Robert H. Montgomery,
Barrington Moore,
Benjamin Moore,
Clement Moore,
J. C. Moore,
Miss Katherine T. Moore,
Mrs. Paul Moore,
Watson S. Moore,
Victor Morawetz,
B. Mordecai,
Miss Anne Morgan,

Miss C. L. Morgan,
E. D. Morgan,
Mrs. J. P. Morgan, Jr.,
Wm. Fellowes Morgan,
J. C. Morgenthau,
Mrs. Dave Hennen Morris,
Dwight W. Morrow,
Mrs. John B. Mott,
Frank J. Muhlfeld,
Edwin H. Mulford,
Carl Muller,
John P. Munn.
Frank A. Munsey,
Miss Adeliza Morton Murphy,
G. M. P. Murphy,
Fred A. Muschenheim,
George A. Mussmann,
William S. Myers,
Mme. Elie Nadelman,
Dr. I. L. Nascher,
Harold Nathan,
National Association, Boards of Pharmacy,
Mrs. Elsie M. B. Naumberg,
A. G. Nesbitt,
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Miss Edith Newbold,
Frederic R. Newbold,
George D. Nicholas,
Mrs. Acosta Nichols,
William B. Nichols,
Mrs. William G. Nichols,
William H. Nichols,
Mrs. Benjamin Nicoll,
William Nilsson,
Dr. Charles Norris,
Miss Fanny Norris,
George Notman,
Howard Notman,
Mrs. Frank Brett Noyes,
Miss Dorothy Oak,
Morgan J. O'Brien,
Mrs. Adolph Obrig,
Adolph S. Ochs,
John Offerman,
Mrs. Ponsonby Ogle,
P. M. Ohmeis,
Miss Catherine Okie,
E. E. Olcott,
Miss Mary Olcott,
Elam Ward Olney,
Robert Olyphant,
John B. O'Reilly,
William C. Orr,
Prof. Henry F. Osborn,
Mrs. William Church Osborn,
Charles K. Ovington,
Homer S. Pace,
Miss Elizabeth H. Packard,
Mrs. Eugene H. Paddock,
Frederick Page Co.,
Mrs. Augustus G. Paine,
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Henry Parish,
Mrs. Hobart J. Park,
Junius Parker,
Mrs. Willard Parker, Jr.,
Winthrop Parker,
Charles W. Parsons,
Mrs. Edgerton Parsons,
Miss Gertrude Parsons,
Herbert Parsons,
Mrs. Joseph Parsons,
Mrs. J. Graham Parsons,
Miss Katherine de B. Parsons,
Miss Mary Parsons,

W. U. Parsons,
T. H. Hoge Patterson,
Rufus L. Patterson,
Mrs. Foster Paul,
J. R. Paull,
Mrs. Horace E. Payson,
Mrs. Charles A. Peacock,
Mrs. Frederick Pearson,
Charles E. Peck,
Dr. Charles H. Peck,
William Halsey Peck,
Mrs. Wheeler H. Peckham,
Dr. James Pedersen,
Mrs. Sarah G. T. Pell,
B. Henry Pelzer,
Miss Isabelle Pendleton,
Edmund Penfold,
J. C. Penney Foundation,
Comtesse de Périgny,
Miss Hattie W. Perkins,
Mrs. F. A. C. Perrine,
W. R. Peters,
Walter Peterson,
Carl Schurz Petrasch,
Mrs. William C. Peyton,
Arthur Pforzheimer,
Carl H. Pforzheimer,
Walter Pforzheimer,
Michael F. Phelan,
Mason M. Phelps,
Mrs. Sheffield Phelps,
Henry Phipps,
Lloyd Phoenix,
Henry Clay Pierce,
Winslow S. Pierce,
Mrs. R. Stuyvesant Pierrepont,
J. Fred Pierson,
Mrs. J. O. H. Pitney,
Mrs. Charles Howard Platt,
Mrs. Frank H. Platt,
John Platt,
Edward Plaut,
Alfred F. Poggenburg,
Rudolph Pokorny,
Miss R. A. Polhemus,
Frank L. Polk,
Miss Florence L. Pond,
Charles Lane Poor,
E. W. Poor,
Mrs. James Harper Poor,
James E. Pope,
Mrs. William C. Popper,
Alexander J. Porter,
Mrs. Frank B. Porter, Jr.,
Mrs. Henry Kirke Porter,
Abram S. Post,
Miss Blanche Potter,
Mrs. Frank H. Potter,
John H. Powrie,
Rev. Dr. William Prall,
Mrs. C. H. Pratt,
Mrs. Herbert Lee Pratt,
John Pratt,
John T. Pratt,
Mrs. L. B. Preston,
Edgar S. Pretzfeld,
Mrs. E. F. Price,
Julius Prince,
H. B. Prindle,
R. L. Pritchard,
Elias W. Pulaski,
Miss Eva C. Putney,
Robert Pyle,
Percy R. Pyne,
Charles F. Quincy,
I. A. Rabinow,

Samuel Raisler,
S. E. Ramsdell,
Stanley Ranger,
William T. Rasmus,
G. B. Raymond,
H. E. Raymond,
Mrs. Henry R. Rea,
Newbury Frost Read,
Mrs. William A. Read,
Robert C. Ream,
Mrs. Louis Reckford,
Miss Emily Redmond,
Henry H. Reed,
Mrs. Augusta Bliss Reese,
C. Edward Reid,
John Reid,
Franklin Remington,
William Rennult,
Samuel W. Reyburn,
Mrs. E. S. Reynal,
Mrs. H. Newell Reynolds,
Thomas A. Reynolds,
Miss N. Rhoades,
Miss Elvine Richard,
Oscar L. Richard,
Miss Edith G. Richards,
Ellis G. Richards,
E. O. Richards,
Mrs. Thomas Richardson,
Isaac Ricklin,
Frederick Rider,
Mrs. Robert Ridgway,
Dr. Abraham Rieger,
Dr. A. I. Ringer,
G. Barclay Rives,
Dr. William C. Rives,
Miss Emeline Roach,
Mrs. Charles H. Roberts,
Irving Bruce Roberts,
Miss Jennette Robertson,
Louis J. Robertson,
A. G. Robinson,
Mrs. Douglas Robinson,
Mrs. Edward Robinson,
Mrs. Monroe D. Robinson,
Mrs. John D. Rockefeller, Jr.
Percy A. Rockefeller,
Nash Rockwood,
John Roger,
Hubert E. Rogers,
A. J. Rolle,
W. Emlen Roosevelt,
Mrs. W. Emlen Roosevelt,
Elihu Root,
Miss Rosalie Rosenberg,
Henry C. Ross,
Peter W. Rouss,
C. H. Ruddock,
Louis Ruhl,
Justus Ruperti,
Jacob Ruppert,
Frederick K. Rupprecht,
Miss M. L. Russell,
John Barry Ryan,
William J. Ryan,
Arthur Ryle,
Miss Julia Ryle,
Harry Sachs,
Samuel Sachs,
Mrs. Henry W. Sackett,
Reuben Sadowsky,
Mrs. T. Shaw Safe,
Mrs. Walter J. Salmon,
Charles E. Sampson,
Mrs. Ralph Samuel,
Mitchell Samuels,

Philip C. Samuels,
H. Sanhagen,
F. A. Sarg,
Miss G. W. Sargent,
Emilie L. Sarter,
Herbert L. Satterlee,
Mrs. Herbert L. Satterlee,
Mrs. Thomas E. Satterthwaite,
Mrs. Theodore Sattler,
Oliver H. Sawyer,
Hermann Schaaf,
Frederick Müller Schall,
Jacob Schapiro,
John Scheepers,
Anton Schefer,
O. Boto Schellberg,
Mrs. H. M. Schieffelin,
Dr. William J. Schieffelin,
Charles A. Schieren,
Gustave H. Schiff,
Max Schling, Inc.,
Miss Jane E. Schmelzel,
Emil Schmitz,
Armand Schmoll,
D. Schnakenberg,
Berthold Schnee,
Harry Schneider,
Henrich Schniewind, Jr.,
Carl Schoen,
W. D. Scholle,
Mrs. Anthony Schulte,
Richard Schuster,
Mrs. C. Albert Schwab,
C. M. Schwab,
Miss Emily Schwab,
M. Charles Schweinert,
Miss Marion Scofield,
Walter Scott,

Miss Grace Scoville,
Herbert Scoville,
Robert Scoville,
Mrs. Arthur H. Scribner,
Edward M. Scudder,
Hewlett Scudder,
Mrs. Joseph H. Seaman,
Alonzo B. See,
Prof. Edwin R. A. Seligman,
Mrs. Isaac N. Seligman,
Jefferson Seligman,
Mrs. Norrie Sellar,
Mrs. Charles H. Senff,
Frederick W. Senff,
Alfred Seton,
Frank G. Shattuck,
Mrs. William F. Sheehan,
Dr. William H. Sheldon,
Finley J. Shepard,
David Shiman,
George W. Short,
Frank R. Shull,
Hiram W. Sibley,
Mrs. J. Siegel,
Samuel M. Siegman,
Benjamin F. Simmons,
Charles H. Simmons,
H. L. Simmons,
H. L. Simmons,
Alfred L. Simon,
Franklin Simon,
Horace E. Simon,
Robert E. Simon,
Theodore E. Simon,
Mrs. Roswell Skeel, Jr.,
Francis Louis Slade,
Ralph E. Slaven,
Benson B. Sloan,

Samuel Sloan,
Thomas W. Slocum,
Thomas Smidt,
Daniel Smiley,
Mrs. Charles Herbert Smith,
Mrs. Charles Stewart Smith,
Charles R. Smith,
E. C. Smith,
Miss Fanny A. Smith,
James B. Smith,
J. Milton Smith,
Dr. Nelson Smith,
Pierre J. Smith,
Mrs. R. Penn Smith, Jr.,
B. E. Smythe,
Frederick Snare,
E. G. Snow,
Frederic A. Soldwedel,
Phineas Sondheim,
William M. Spackman,
Mrs. H. B. Spalding,
Mrs. Edward W. Sparrow,
Mrs. Joseph McK. Speer,
K. B. Spencer,
Mrs. Gino C. Speranza,
Mrs. B. G. Spiegelberg,
A. T. Stanley,
Howard W. Starr,
E. Vail Stebbins,
Mrs. J. Rich Steers,
Mrs. Mary P. Eno Steffanson,
Louis Steinam,
William H. Steinkamp,
Fred T. Steinway,
William R. Steinway,
Olin J. Stephens,
Roderick Stephens,
Benjamin Stern,
Sereno Stetson,
Edward R. Stettinius,
Mrs. Byam K. Stevens,
Clarence S. Stevens,
Frederic W. Stevens,
Lispenard Stewart,
Chauncy Stillman,
C. C. Stillman,
Miss Clara F. Stillman,
Ralph George Stoddard,
Alfred W. Stone,
Mrs. Charles H. Stout,
Mrs. Willard Straight,
H. Grant Straus,
Mrs. Nathan Straus, Jr.
Roger W. Straus,
Albert Strauss,
Mrs. Daisy Strauss,
Frederick Strauss,
Martin Strauss,
Samuel Strauss,
William H. Strawn,
Dr. George T. Strodl,
Mrs. Gustaf Stromberg,
Benjamin Strong, Jr.,
John R. Strong,
Nat. C. Strong,
Richard A. Strong,
Mrs. Theron G. Strong,
Joseph Stroock,
Louis S. Stroock,
Duncan Struthers,
Francis Lee Stuart,
Frank K. Sturgis,
Mrs. Paul Sturtevant,
Mrs. James Sullivan,
Frank M. Swacker,
Harry Swan,

Mrs. J. Andrews Swan,
Maurice Switzer,
Miss Mary Taber,
Henry W. Taft,
Mrs. E. T. H. Talmage,
Charles G. Taylor,
Henry R. Taylor,
Dr. Richard A. Taylor,
W. A. Taylor,
Miss Gertrude M. Telke,
H. L. Terrell,
Mrs. John T. Terry,
Mrs. Thomas Thacher,
Mrs. T. D. Thacher,
Mrs. Bayard Thayer,
H. B. Thayer,
E. Thiele,
Mrs. H. M. Thomas,
Mrs. Hector W. Thomas,
Mrs. Howard L. Thomas,
Percival Thomas,
L. S. Thompson,
William B. Thompson,
Dr. W. Gilman Thompson,
Mrs. Edwin Thorne,
Samuel Thorne,
Sherman Thursby,
Louis C. Tiffany,
Henry N. Tifft,
Dr. Walter Timme,
R. H. Timmermann,
James Timpson,
Mrs. Norman E. Titus,
Rev. E. P. Tivnan, S. J.,
Mrs. Margaret T. Tjader,
J. Kennedy Tod,
Edward R. Tolfree,
Nesib Trabulsi,
W. C. Tragesor,
Mrs. John B. Trevor,
John Trounstine,
E. Kellogg Trowbridge,
Carll Tucker,
Paul Tuckerman,
Edward Turnbull,
George E. Turnure,
Mrs. Mary A. Tuttle,
Mrs. Charles H. Tweed,
Mrs. Alice B. Tweedy,
Lucien H. Tyng,
August Uhl,
Mrs. Walter M. Underhill,
Mrs. Henry C. Valentine,
Miss Marguerite E. Valentine,
James J. Van Alen,
Augustus Van Cortlandt,
Francis S. van der Veer,
Barend van Gerbig,
John B. Van Haelen,
Mrs. Stephen G. Van Hoesen,
Miss Anne H. Van Ingen,
Miss Louise Van Ingen,
Dr. Philip Van Ingen,
Mrs. Warner M. Van Norden,
Mrs. E. van Raalte,
Mrs. Louisa Van Wezel,
Mrs. Wilbur Linwood Varian,
Mrs. James M. Varnum,
Mrs. A. C. Veatch,
Thomas F. Vietor,
Alfonso P. Villa,
G. B. Vitelli,
Ludwig Vogelstein,
Mrs. Owen M. Voight,
Mrs. Anna M. von Zedlitz,
Dr. Antonie P. Voislawsky,

Frederick K. Vreeland,
Montgomery Waddell,
Mrs. W. Austin Wadsworth,
Dr. A. F. Wahl,
Mrs. J. Howard Wainwright,
Justus I. Wakelee,
Mrs. Joseph Walker, Jr.,
Stuart Walker,
William I. Walker,
Mrs. W. K. Wallbridge,
Alfred Wallerstein,
Leo Wallerstein,
Dr. Max Wallerstein,
William I. Walter,
Artemus Ward,
A. L. D. Warner,
Mrs. John I. Waterbury,
C. W. Watson,
Harry Wearne,
Mrs. E. H. Weatherbee,
Mrs. V. Webb,
Mrs. W. Seward Webb,
Mrs. Orlando F. Weber,
Mrs. Alden H. Weed,
Miss Alice D. Weekes,
Dr. Eugene Wehmeyer,
George A. Weigel,
Charles H. Weigle,
Mrs. Harriet Weil,
Mrs. Walter L. Weil,
Mrs. Charles Weiss,
S. J. Weiss,
Mrs. Samuel W. Weiss,
Mrs. John Wells,
Oliver J. Wells,
William Y. Wemple,
Miss Edith Wetmore,
Mrs. Frederick S. Wheeler,
Mrs. George C. Wheeler,
Dr. Wm. E. Wheelock,
Miss Caroline White,
Mrs. E. Lawrence White,
Harold T. White,
Mrs. William T. White,
Clarence Whitman,
Mrs. Arnold Whitridge,
Miss Joan Whitridge,
Howard Whittemore,
F. B. Wiborg,
Mrs. D. O. Wickham,
Walter R. Wilder,
Ernest J. Wile,
Dr. Ira S. Wile,
Irwin Wile,
C. Robert Wilhelm,
Elmore A. Willets,
J. Macy Willets,
Mrs. Percy H. Williams,
Richard H. Williams,
William H. Williams,
W. P. Willis,
James R. Williston,
Mrs. L. K. Wilmerding,
Frank D. Wilsey,
Dr. Margaret B. Wilson,
M. Orme Wilson,
Orme Wilson Jr.,
Charles A. Wimpfheimer,
Harold Wingate,
Bronson Winthrop,
Grenville L. Winthrop,
Mrs. Robert Winthrop,
John C. Wister,
Mrs. Frank S. Witherbee,
Joseph Wittman,
Dr. William H. Woglom,

Fred R. Wolff,
Lewis S. Wolff,
M. Wolff,
Mrs. T. Wolfson,
Ernest Wolwitz,
Mrs. William H. Woodin,
Park M. Woolley,
Mrs. I. Maurice Wormser,
Martin Wortmann,
Miss Julia Wray,
Mrs. J. Hood Wright,
Richardson Wright,
Gustave A. Wuefel,
Dr. Peter B. Wyckoff,
Mrs. Irene S. Wyle,
Mrs. A. Murray Young,
Owen D. Young,
Mrs. Cornelius A. Zabriskie,
George A. Zabriskie,
Henry C. Zaro,
Charles H. Zehnder,
Miss Jessie Ziegler,
Albert G. Zimmermann,
August Zinsser,
Charles Zoller,
Henry Zuckerman.

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Miss Elizabeth Hamilton,
Mrs. A. Barton Hepburn,
Mrs. Robert C. Hill,
Mrs. Walter Jennings,
Mrs. Bradish Johnson,
Mrs. Delancey Kane,
Mrs. Gustav E. Kissel,
Mrs. Frederic S. Lee,
Mrs. William A. Lockwood,
Mrs. A. A. Low,
Mrs. V. Everit Macy,
Mrs. Pierre Mali,
Mrs. Henry Marquand,
Mrs. Wheeler H. Peckham,
Mrs. George W. Perkins,
Mrs. Harold I. Pratt,
Mrs. Wm. Kelly Prentice,
Mrs. William A. Read,
Mrs. James Roosevelt,
Mrs. Arthur B. Scribner,
Mrs. Benson B. Sloan,
Mrs. Samuel Sloan,
Mrs. Theron G. Strong,
Mrs. Edw. T. H. Talmage,
Mrs. Henry O. Taylor,
Mrs. John T. Terry,
Mrs. W. Gilman Thompson,
Mrs. George Cabot Ward,
Mrs. William H. Woodin,

Honorary Members of the Advisory Council

Mrs. E. Henry Harriman,
Mrs. John I. Kane,
Mrs. James A. Scrymser,
Miss Olivia E. P. Stokes.

REPORT OF THE TREASURER

NEW YORK, MARCH 10, 1925

TO THE BOARD OF MANAGERS OF THE NEW YORK BOTANICAL GARDEN.

Gentlemen: I beg to submit herewith the Treasurer's Annual Report for the year 1924, showing Receipts and Disbursements from January 1st to December 31st, together with a statement of the Ledger Balances as of December 31st, 1924.

Respectfully,

JOHN L. MERRILL,
Treasurer

STATEMENT OF RECEIPTS AND DISBURSEMENTS

January 1st, to December 31st, 1924

Cash on Hand January 1st, 1924		$ 29,494.19
Receipts		
The Endowment and Development Fund	$ 3,000.00	
Frances Griscom Parsons Fund	2,000.00	
Sage Fund, 4th Distribution		
Cash	$12,280.00	
Stock	27,720.00	
	40,000.00	
Less treated as Income	10,400.00	
	$29,600.00	
Amer. Tel. & Tel. Rights (Sold)	1,639.06	
Genl. Electric Special Stock 63 shs.	630.00	
Mo. Kansas & Texas (Sold)	3,208.00	
		35,077.06
Life Membership Fee		250.00
Fellowship for Life Fee		1,000.00
Income of Special Trust Funds	2,020.00	
Income of General Investments	26,067.50	
Income of Sage Investments	38,131.60	
Income of Sage Investments (part of legacy treated as income)	10,400.00	
		76,619.10
General Income		14,579.84
Special Garden Accounts		13,724.02
Special Income Accounts		6,071.72
City Maintenance		154,574.42
City Maintenance		47,331.49

Director-in-Chief, Working Fund		
Items paid out of Fund and not reimbursed by the Treasurer and the City		
Garden Accounts	17,023.61	
City Maintenance	12,636.97	
	29,660.58	
		383,888.23
Unaudited Vouchers		10,146.37
		$423,528.79

Disbursements

Loan Paid	$25,000.00	
Interest on Loan	770.83	
Special Trust Funds	2,020.00	
Investments, General		
Purchased 100 shares American Tobacco	10,227.50	
Investments, Sage		
Received 126 shares General Electric	27,720.00	
Received 63 shares General Electric	630.00	
Collection Charges Bank, General	73.43	
Collection Charges Bank, Sage	146.87	
Collection Charges out of town checks	.50	
Loss on Sale of Sage Investments	137.25	
Vouchers Paid through Director for expenses of 1923		
General Income Accounts	4,050.67	
Special Garden Accounts	7,186.00	
Special Income Accounts	12,929.16	
City Maintenance	2,023.86	
For expenses of 1924		
General Income Accounts	29,234.54	
Special Garden Accounts	13,930.09	
Special Income Accounts	66,272.94	
City Maintenance	165,187.53	
		300,814.79
City Maintenance		
Payments made by City	47,331.49	
		414,872.66
Undeposited Coupon Interest		160.00

Cash on Hand		
New York Trust Co.	$5,389.99	
J. P. Morgan & Co.	106.14	
		5,496.13
Special Account		
J. P. Morgan & Co.	3,000.00	
		8,496.13
		$423,528.79

Ledger Balances as of December 31, 1924

		Debit	*Credit*
Charles P. Daly Trust Fund	$19,636.34		
Special Trust Fund	17,000.00		
Addison Brown Fund	21,850.00		
Endowment Fund for Science and Education	91,836.90		
Maria DeWitt Jesup Fund	25,000.00		
John Innes Kane Fund	10,000.00		
Stokes Fund	3,000.00		
Students' Research Fund	4,488.00		
Endowment & Development Fund	3,000.00		
Fanny Bridgham Fund	30,000.00		
Endowment Fund	273,010.00		
Henry Iden Fund	10,000.00		
David Lydig Fund	34,337.86		
Darius Ogden Mills Fund	50,000.00		
Frances Griscom Parsons Fund	2,000.00		
Charles Budd Robinson Fund	755.04		
Sage Fund	667,555.69		
Wm. R. Sands Fund	10,000.00		
Francis Lynde Stetson Fund	25,000.00		
			$1,298,469.83
Special Trust Investments			
Special Trust		$ 17,000.00	
General Investments		560,716.36	
Sage Fund Investments		667,718.68	
Special Cash Fund			
For Endowment and Development Fund		3,000.00	
Special Garden Accounts			
Plant Fund		61.68	
Exploration Fund		41.04	
Special Book Fund		118.95	
Museum and Herbarium Fund		11.08	
Special Development Fund		275.57	
Lecture Fund		10.12	

Laboratory Fund		20.73
Investigation Fund		89.73
Publication Fund		11.98
Special Income Accounts		
Income of Addison Brown Fund		372.60
Income of Science and Education Fund	956.95	
Income of Maria DeWitt Jesup Fund	266.95	
Income of John I. Kane Fund		118.48
Income of Stokes Fund		133.34
Income of Students' Research Fund		729.36
Income of Fanny Bridgham Fund	508.20	
Income of Henry Iden Fund		273.84
Income of David Lydig Fund	3,850.04	
Income of Darius Ogden Mills Fund	681.87	
Income of Charles Budd Robinson Memorial Fund		117.64
Income of Wm. R. Sands Fund		186.22
Income of Sage Fund	14,917.65	
Income of Francis Lynde Stetson Fund		307.02
Income of Frances Griscom Parsons Fund		59.02
Unaudited Vouchers		10,146.37
General Income Account	14,746.63	
Reserve Fund	8,558.75	
City Maintenance	12,636.97	
Undeposited Coupon Interest	160.00	
Director-in-Chief, Working Fund	339.42	
Cash Balance, December 31st, 1924	5,496.13	
	$1,311,554.60	$1,311,554.60

TREASURER'S ACCOUNT FOR THE YEAR 1924

466 Lexington Avenue

New York, April 7, 1925

MR. ROBERT W. DE FOREST,

Chairman, Finance Committee, New York Botanical Garden,

30 Broad Street, New York, N. Y.

Dear Sir:

This is to certify that I have, by direction of the Board of Managers, examined the books and accounts of the Treasurer of The New York Botanical Garden for the year nineteen hundred and twenty-four (1924), together with their proper vouchers, and that I find the balance sheet and the Treasurer's statement of receipts and disbursements attached hereto to be correct.

The various investment securities have also been verified and accounted for, and I certify that the statement of the same reported in the balance sheet of December 31st, 1924, is correct.

Respectfully submitted,

A. W. STONE,

Special Auditor

VOL. 13 No. 47

BULLETIN

OF

THE NEW YORK BOTANICAL GARDEN

ISSUED JUNE 3, 1926

CONTENTS

REPORT OF THE PRESIDENT AND CHAIRMAN OF THE EXECUTIVE COMMITTEE 87

Report of the Secretary and Director-in-Chief for the Year 1925 95

Report of the Head Curator of the Museums and Herbarium 109

Report of the Head Gardener 115

Report of the Director of the Laboratories 120

Report of the Bibliographer 124

Report of the Librarian 125

Report of the Superintendent of Buildings and Grounds 127

Report of the Honorary Curator of the Economic Collections 132

Report of the Paleobotanist 134

Report of the Honorary Curator of Mosses 136

Report of the Honorary Custodian of the Local Herbarium 139

Report of the Chairman of the Scientific Directors 140

FINANCIAL STATEMENTS 142

REPORT OF THE COMMITTEE ON PATRONS, FELLOWS, AND MEMBERS FOR THE YEAR 1925 148

BULLETIN
OF
The New York Botanical Garden

Vol. 13 No. 47

REPORT OF THE PRESIDENT AND CHAIRMAN OF THE EXECUTIVE COMMITTEE

THE BOARD OF MANAGERS OF THE NEW YORK BOTANICAL GARDEN

Gentlemen:

I have the honor to submit a report on some of the significant activities of the Botanical Garden during the year 1925.

It will be recalled that in November, 1924, the Board voted to enter upon a campaign to raise the sum of $4,160,000 in order to begin the realization of the new plans for the development of the Garden. A Campaign Committee was at once appointed and entered upon its task. Profiting from the experience of other institutions engaged in similar efforts, the Committee decided to seek, first, special gifts of considerable value from a few individuals, while preparing the ground for a more general effort later. Thus inaugurated, the campaign has been conducted quietly during 1925, and the year ends with the securing of pledges to the Garden's funds for carrying out the new plans of approximately $850,000, of which $250,000 is contingent upon the receipt of the subscription of an additional $150,000 by December 31, 1926. An appreciable proportion of the sum pledged has already been paid into the Garden's treasury. The Committee

feels that this is a gratifying beginning and gives encouragement for the ultimate success of its efforts, which with the Board's approval will be continued in the coming year. For the present the sums received have been added to the Garden's endowment and have been kept intact, and it is wise to continue this procedure. With the receipt of a much larger sum the apportionment of the whole in relation to the needs of the Garden as a whole should be undertaken.

It was early realized that, with the past achievements, the future possibilities, and the financial needs of the Garden less known than they should be, the task of securing considerable additions to its funds would not be a brief one. Special stress, therefore, has been laid upon the education of the public in these matters—through private interviews, public addresses, and the press. No opportunity has been neglected of making the Garden favorably known. The press of the City and, indeed, of the whole country, has welcomed to its columns and circulated widely accounts of the Garden's activities and plans for the future, and such accounts have received much favorable editorial and private comment. The reputation of the institution and the number of its friends have thus been materially increased, and this will count to its advantage in many ways, financial and otherwise, in the future. But the justifiable goal is still far away. A still larger public should learn of the Garden's services. Especial efforts, too, should be made in the coming year toward enrolling its friends among its members. The membership list should promptly be doubled, if not trebled.

In the President's "Statement Concerning The New York Botanical Garden" submitted to the Board in 1923 it was stated: "In its Women's Auxiliary the Garden possesses great possibilities for aid which have not been adequately utilized." During the past year the Auxil-

iary, under its new name, Advisory Council, has played a larger part in the Garden's affairs than ever before. It has increased its membership and has inaugurated a series of regular meetings throughout the year. The attendance at its meetings has materially increased. It has kept in touch with the new plans for the development of the Garden and has made valuable suggestions thereto. It has stimulated among the garden clubs in the vicinity of New York a spirit of interest in and coöperation with the Botanical Garden and has made clear the mutual advantages of close relationship. The assistance which this group of influential women can lend to the Garden's prestige and development in the future is bound to increase more and more.

In the "Statement" of 1923, it was suggested that the Botanical Garden might well be made serviceable to garden-lovers by constructing various types of model gardens and separate garden features adapted to specific needs. These have now begun to be a reality. In March, 1925, a friend of the Garden, who wishes to remain anonymous, offered to bear the expense of laying out and planting at a selected spot within the grounds of the Botanical Garden "a small and artistic garden showing what can be done in this line within a very limited area and at a very moderate cost as an encouragement and practical example for flower lovers of moderate means." This offer was gratefully accepted by the Board. The site selected was just north of the western end of Conservatory Range No. 1, and covered a plot 25 by 50 feet in area. The planting, following an attractive design, was installed as soon as was practicable, a considerable growth took place during the summer, and the value of the garden as a model of what can be accomplished simply and tastefully will fully appear during the coming season. In May, 1925, the same donor further offered to the Botanical Garden "a fund of $5,000 to be

known as 'The H. H. Memorial,' the principal and interest of which shall be dedicated by the Board of Managers primarily to defraying the expenses of a competition, open to professionals and amateurs, for designs of small gardens and for the reproduction of the winning designs in the Botanical Garden during the spring and summer of 1926 and, as far as the available funds will permit, in subsequent years. It shall be understood, however, that the funds may, in the discretion of the Board of Managers, be diverted after 1926 to any other purpose which they may deem desirable, with the request, however, that said funds, if so diverted from the primary purpose, be used for some purpose which will popularize the Botanical Garden." Following the enthusiastic acceptance of the gift by this Board, a Committee appointed by the President arranged the details and made formal announcement of the proposed competition. After the receipt of the designs, the final date for which is March 1, 1926, the awards will be made and the planting of the prize-winning design will be promptly undertaken. By these two gifts, this friend of the Garden has taken the initiative in what will without doubt prove to be a very important feature of the Garden's usefulness to the public. In this connection mention should also be made of the planting of an attractive ornamental border which was designed by Mrs. Robert C. Hill and the utilization of which was suggested by her fellow-members of the Advisory Council.

During the past few years the Garden has been increasing its outdoor horticultural exhibits, but at no time have they reached the extent and magnificence that was achieved during the summer of 1925. A series of Flower Days was established, each of which was marked by the culmination of an exhibition of a popular flower. These comprised the following:

Narcissi	47,000	plants	representing	130	varieties
Tulips	60,000	"	"	154	"
Irises	3,000	"	"	1,000	"
Peonies	427	"	"	166	"
Roses	4,500	"	"	240	"
Dahlias	850	"	"	350	"
Chrysanthemums	1,000	"	"	140	"

Many persons coöperated in making these exhibits a success, but especial thanks for their aid should be extended to Mrs. Wheeler H. Peckham, of the Advisory Council, who planned the exhibit of narcissi; to Mrs. Peckham and Mr. John C. Wister, President of the American Iris Society, for the remarkable collection of irises; and to Dr. Marshall A. Howe, Assistant Director of the Garden, who has for several years fostered the exhibit of dahlias. I think it safe to say that no other garden in this country has offered such an opportunity to see and study the many varieties of these flowers as has the Botanical Garden. Every effort should be made in the future to make these and other flower shows of national importance, for there is no surer way of winning to the Botanical Garden the adherence of the large and ever-growing garden-loving public.

The completion of the Bronx River Parkway, which debouches into the Botanical Garden at its northern end, is an event of great importance to the Garden, for both its advantages and its disadvantages. Its charming drive for miles along the course of the Bronx River will undoubtedly prove one of the most popular routes of travel between the city and Westchester County. The Botanical Garden presents the largest, most varied, and most beautiful single feature of this route. The number of its visitors who come by motor car will, therefore, be much increased, and this will contribute in considerable degree to the Garden's popularity. But the most of this added travel will be through-traffic, with the Garden becoming

merely a convenience for the travelers, whose main object will be to reach their destination in the city or country in the shortest possible time. No one has pointed out the deleterious character of this invasion of the Garden's precincts more forcibly than has Mr. Frederick Law Olmsted, who says in his "Report on The New York Botanical Garden":

"The successive steps in the formation of routes of automobile travel within and through and near Bronx Park, largely controlled as they have been by considerations entirely independent of the Botanical Garden, and the interjection of the Botanical Garden into the area traversed by or affected by these routes, have resulted in a situation quite unprecedented, so far as we know, in any of the important botanical gardens of the world.

"Many of these botanical gardens are substantially self-contained, free from intersecting through-routes of vehicular travel, and subject to design and management for botanical garden purposes alone. Most of them, like Kew, have no roads for public vehicular travel within them at all. The Arnold Arboretum . . . has roads open to the public in the daytime, but it is completely closed at night and up to the present time the roads have not been open to automobiles. In an area the size of The New York Botanical Garden, we believe that automobile roads for circulation within the area are necessary and desirable. . . . But the successive and almost independent steps in the development of the *main lines* of *through-travel* for automobiles in this part of the Borough of the Bronx, have placed the Garden in the path of some of the most important of these lines and thrown upon its roads a burden of through-traffic which is already a very serious problem and bids fair to become immensely worse.

"The completion of Bronx River Parkway, . . . taken in connection with the prior opening of the Grand Concourse . . . opens through the Garden, on roads very ill adapted to the purpose, what is plainly destined to be one of the most busily thronged automobile thoroughfares leading in and out of Manhattan. Both for the benefit of this through-traffic as such and for the benefit of the

Botanical Garden as such, a radical improvement in this situation seems almost imperative.''

The menace of the motor car thus threatened by the completion of the Bronx River Parkway is still further emphasized by the plans developed at recent conferences between the Park authorities of the City and the State, which present a comprehensive park program for the five boroughs of the City. This plan, if I am correctly informed, deliberately contemplates the area of the Botanical Garden as affording a parkway to connect with the Bronx River Parkway. A question that has been looming during the past few years is thus clearly before the administrative authorities of the Garden: Is the Botanical Garden to be regarded in the future as primarily a botanical garden, with its own specific problems and its vast advantages which it offers freely to the people; or is it to be regarded as primarily a park and subject to the same character of development and treatment as are other city parks? Between a botanical garden as such and a city park as such there are fundamental differences, which cannot be detailed here. But it has been well said that automobile through-traffic is ''wholly contrary to the spirit of the botanical garden,'' which should offer ''a sense of quiet safety and remoteness from the noise and haste of the city.''

In the resolution adopted by this Board November 20, 1924, which approved the Report of Olmsted Brothers in principle as a guide for the future treatment of the grounds of the Garden, it was stipulated that ''there be reserved for future consideration that part of the Report which deals with the proposed modifications of the present road system.'' It should now be considered whether the time has not arrived for a careful study of the new conditions now presented to the Garden, which were not dreamed of when the institution was first planned.

Attention should be called to the new system of financial accounting which has been established and goes into effect with the beginning of 1926. This system is in harmony with the best and accepted methods of accounting. It rightly centralizes the details of financial administration in, and gives greater responsibility and dignity to, the office of the Treasurer. It should be regarded as one of the outstanding accomplishments of the year; and, as the funds and corresponding financial responsibilities of the Garden increase, its value will be more and more evident.

Details of the above-mentioned and many other activities of the Garden during 1925 will appear in the Reports of the Director-in-Chief and other officers. The year has been characterized by substantial progress, both along the long-established lines of activity and especially toward the goal of the new endeavors. In the light of dawning achievement the new plans appear more justifiable and more worth the labor of achieving. The President trusts that the members of the Board will recognize, each more clearly than before, his own individual responsibility and the necessity of his own individual share in the common effort to make The New York Botanical Garden the outstanding institution of its kind in America.

Respectfully submitted,

FREDERIC S. LEE,

President, and Chairman of the Executive Committee

REPORT OF THE SECRETARY AND DIRECTOR-IN-CHIEF FOR THE YEAR 1925

To the Board of Managers of The New York Botanical Garden.

Gentlemen: I have the honor to submit my report for the year ending January 11, 1926.

All existing plantations have been maintained but the need for more gardeners, laborers, and keepers has been increasingly urgent.

Additions and modifications have included the planting of over 14,000 narcissus bulbs of 46 varieties in part given by the Holland Bulb Growers' Association, in part by Mrs. Wheeler H. Peckham, and in part purchased by contributions secured by Mrs. Peckham as follows:

Mrs. W. H. Aldridge	$ 10.00
Miss E. Mabel Clark	5.00
Mrs. F. A. Constable	100.00
Mr. Henry J. Eckstein	10.00
Mrs. Samuel Edson Gage	5.00
Mrs. Frederick C. Hodgdon	10.00
Mrs. Alfred McEwen	10.00
Mrs. Wheeler H. Peckham	120.00
Mrs. Anna S. Pitt	5.00
Douglaston Garden Club	10.00
New Canaan Garden Club	25.00
Riverdale Garden Club	10.00
The Garden Club of Nyack	25.00
Total	$ 345.00

In continued coöperation with the American Iris Society, additions have been made to the iris collection, and during the summer, the main extensive series of bearded varieties was completely replanted to a color-scheme designed by Mrs. Peckham, Mr. Sturtevant, and Mr. Wister,

and the work directed by them; surplus plants were sent to other parks and gardens. Experimental work has been done with many native irises collected by Dr. Small in the southern states, especially Florida.

In the Rose Garden, additions and replacements include about 1,000 plants of 90 varieties contributed by Messrs. Bobbink and Atkins. An invitation has been extended to the American Rose Society to hold its meeting in June, 1926, at the Garden.

The display of tulips in the spring included about 60,000, planted in the Court of Conservatory Range No. 1, in 154 varieties. There have been planted this autumn, partly in this court and partly at the entrance to the Horticultural Grounds on the Southern Boulevard, nearly as many bulbs, given in part by the Holland Bulb Growers' Association and in part by Mr. John Scheepers.

In connection with the "H. H. Memorial Fund" established by a gift of $5,000, a model small garden, 52 feet long, 40 feet wide, was built and planted at the western end of the Flower Gardens near Conservatory Range No. 1. Income from this fund will be used in 1926, for prizes for competitive designs for other small gardens, the most approved design to be reproduced at the eastern end of these Flower Gardens.

In the Horticultural Grounds west of the Rock Garden, a new plantation of day-lilies was made, comprising 46 kinds bred by Dr. Stout, most of them hybrids new to cultivation. Lilies hitherto grown here were transferred to the Flower Gardens. A collection of dwarf trees and shrubs, made up of 52 plants, assembled from several points in the grounds, and established east of the Rock Garden and the collections of phloxes and of hardy chrysanthemums nearby, were increased. Here a plantation of late-flowering shrubs has also been established.

Dr. Southwick has actively continued the planting of the Rock Garden, having essentially completed its con-

struction. Many rare plants have been grown from seeds obtained by him from various sources at home and abroad, and by exchange and coöperation with lovers of rock gardens, notably with Mr. Clarence Lown, of Poughkeepsie, and Mrs. Wheeler H. Peckham. He has also increased the plantations of American wild flowers and of hardy ferns, and, with much assistance from Mr. Percy Wilson, has increased and improved the plantations in the Herbaceous Grounds.

Dr. Howe continued in charge of the Dahlia Collection, planted near the railroad station, in which some 88 kinds not hitherto grown by us, were included. Climatic conditions of the season were unfavorable for Dahlia cultivation in the eastern states; nevertheless, the Dahlia exhibit, as usual, attracted many visitors.

Additions were made to the Arboretum, the Pinetum, and the Fruticetum, mainly by trees and shrubs moved in the spring from the nurseries; these included 80 trees and 248 shrubs.

Reconstruction of the planting compartments in the large tank for hardy water-lilies in the Conservatory Court effected the best display of these plants we have as yet made, 51 kinds flowering profusely during the summer, together with 38 kinds of tender ones in the other tank. All were under the care of Mr. Becker, Foreman Gardener.

Greenhouse collections have been modified to some extent by additions and substitutions. At Conservatory Range No. 1, reglazing roofs and interior painting of houses 6 and 13 necessitated the rearrangement of parts of the collections, and rebuilding benches in house 10 required moving the whole aroid collection temporarily into other houses and its return and rearrangement.

At Conservatory Range No. 2, the collections of tropical ferns and of cycads have made noteworthy growth and are now more elegant and instructive than ever before,

and parts of the large collections of orchids were rearranged and improved, under the immediate direction of John Hastings, gardener in charge.

The total number of species and varieties of plants in the grounds and greenhouses is about 15,700. Mr. Boynton, Head Gardener, has had charge of this vast collection, the general outdoor gardening work under Foreman Finley, the greenhouse work and the water-lily tanks under Foreman Becker, the Rock Garden and the Herbaceous Grounds under Dr. Southwick. The botany of all this collection, however, the care of the herbarium of cultivated plants, and all recording and labelling has been accomplished by Mr. Boynton, with but little assistance; this has been possible only through his extremely broad and accurate knowledge of cultivated plants. His work should be supplemented or divided, when possible, first by the appointment of a dendrologist to be put in charge of all the collections of trees and shrubs, to enable us to take our proper part in the rapidly increasing science of dendrology.

The tar and gravel road-surfaces hitherto in use on garden driveways, constructed and maintained by the Department of Parks, have long been expensive to keep in repair and deleterious to lawn-borders. These conditions have been eliminated during the summer on a large part of the driveway system west of the Bronx River, through surface construction in concrete and asphalt with low concrete curbing and effective draining; this noteworthy improvement was obtained by Park Commissioner Hennessy, through a city appropriation, as a part of the program for resurfacing driveways in the parks and parkways of The Bronx. Top soil aggregating about 2,500 cubic yards for border-grading was included in the contract.

A request was made by the Board of Managers on June 18, 1925, to Park Commissioner Hennessy that he

apply to the Board of Estimate and Apportionment for an appropriation of $160,000 for building a driveway connection between the Rose Garden and the Iris Garden, including a bridge over the Bronx River. Mr. Hennessy transmitted this request, with an explanatory letter, to His Honor, Mayor Hylan, on July 15, 1925, together with the preliminary plans required, drawn by Mr. Brinley after consultation with engineers Farrelly and Seymour of the Park Department. The request has received some consideration, but no action has yet been taken. This driveway construction, when built, will complete the system of interior roads for Bronx Park. It has been located nearly as indicated in the report of Olmsted Brothers, but includes also the reconstruction and realignment of the present dangerously narrow road extending from the Rose Garden to Pelham Parkway.

Two paths, partly constructed in 1924, were completed and opened for public use during the year, using available broken stone, soil and ashes, labor only being required. These are both woodland paths, the one extending from the sidewalk of Pelham Parkway near the southeastern corner of the reservation to the Rose Garden, a distance of about 1,200 feet, the other providing a new approach to the Iris Garden from the south, a distance of about 900 feet; both were built along the lines of former wood-trails without the removal of any trees. Experience has shown with us, as elsewhere, that an ample path-system, with guard-rails and sufficient patrol, is the only sure protection of plantations and of natural features from trampling, vandalism, and fire. In order to obtain this security, the path-system should be completed, guard-railed where necessary as determined from observation, and the number of keepers increased. Already from inability to effect such protection, there has been some deterioration of woodlands, but prompt action may restore this damage.

The completion was effected of about 400 feet of boundary wall and fence, partly constructed along Pelham Parkway in 1924, by the purchase and erection of the iron fencing required. A bequest of $5,000 received from the executors of the estate of Helen C. Inslee has been made available for building the Linnaean Bridge entrance on Pelham Parkway. Provision for the completion of the boundary wall and fence along both the Southern Boulevard and Pelham Parkway during 1926 is very desirable.

The demolition of the ruined Lorillard Mansion commenced late in 1924 was completed in the early summer of 1925. The work was all done by garden employees and the materials stacked for future use; these include large quantities of excellent building stone, bricks, glass, timber, and slate, available for many construction purposes; some of this material has already been used in building cold-frames, paths, and drainage-basins. The site of this building remains to be regulated, graded, and prepared for planting; some soil used for filling the cellar excavation has recently been obtained without cost, but more is required. The area when graded will provide an excellent place for plantations, well protected by woodlands.

As authorized by the subcommittee of the Executive Committee, a communication was addressed to Park Commissioner Hennessy on September 18, 1925, asking his consent to the removal of the stable, shops, and greenhouses of his department standing on parcels of land east of the Bronx River in Bronx Park reserved for these structures by the Board of Estimate and Apportionment in 1915, at which time an addition of about 150 acres of land was made to the Garden by that Board as authorized; Mr. Hennessy was also requested in the communication, subject to his consent to these removals being given, to apply to the Board of Estimate for an appropriation of $150,000 to meet the expense involved and

also to recommend the transferral of these parcels of land to the use of the Garden for the development there, and on lands adjoining, of plantations suggested in the report of Olmsted Brothers, at an estimated cost to the Board of Managers of not less than $100,000. The Commissioner was of the opinion that the time which would be required for consideration and action under this request was too little before the termination of the recent city administration at the end of 1925.

An area of somewhat more than an acre of stony and rocky hillside near the museum building was regulated, graded, and sown with grass-seed during the autumn, much improving its appearance. Some rock excavation remains to be accomplished there. The stone obtained in the grading was all utilized in path-building. This work and some of the guard-railing placed along paths was accomplished by the aid of the following contributions credited to the Special Development Fund:

Dr. N. L. Britton	$1,000.00
Miss Mary A. Dill	15.00
Mr. Childs Frick	250.00
Mrs. Richard March Hoe	15.00
Mr. John Hubbard	250.00
Mrs. William A. Lockwood	25.00
Mr. Charles Lathrop Pack	50.00
Mrs. Wheeler H. Peckham	25.00
Mr. Ogden Reid	50.00
Mrs. James A. Scrymser	500.00
Mr. F. K. Sturgis	250.00
Total	$2,430.00

Several thousand cubic yards of material needed for filling in the bottom of the lake valley suggested for a Rhododendron Glade in the southeastern part of the grounds has been dumped there by contractors, without

cost to the Garden, but requires distribution; more can probably be obtained from similar sources by taking advantage of opportunities. But much more filling than was at first contemplated will be needed on account of the blockage of the old drainage culvert, at some point south of the Garden, first made evident in August, 1925, by the rising of the water in this valley. This unexpected condition requires taking the valley drainage into a city sewer in the Bronx Boulevard near by, but the grade of that sewer is several feet above the bottom of the valley. The Park Commissioner has been requested to obtain permission for such a sewer connection, and to apply for a city appropriation for it, and for the filling required.

A liberal city appropriation for repairs and renewals has enabled us to effect all necessary painting of boundary fences and of buildings, to reglaze the roofs of two greenhouses of Conservatory Range No. 1, to reroof the stable, a small storage house, and the lakeside shelter house, to replace shades in several greenhouses, and in part of the museum building, to replace worn-out benches in greenhouse No. 10, Conservatory Range No. 1, and many other minor repairs and replacements.

Plans and specifications for the electric lighting of the Museum Building were authorized by the Board of Managers on April 16, 1925, and after preparation by Mr. Brinley, in consultation with Mr. Henry A. Sinclair, electrical engineer, and other experts, were transmitted to Park Commissioner Hennessy on August 5, 1925, with a request that he apply for a city appropriation of $10,000. The Commissioner applied for an issue of special revenue bonds in this amount, and these were voted by the Board of Aldermen on November 30, 1925. The appropriation awaits action by the Board of Estimate and Apportionment.

Thirty-nine illustrated public lectures were given in the Museum Building on Saturday afternoons from

March to November, inclusive, and twelve talks and demonstrations were given in the Central Display Greenhouse of Conservatory Range 2 on Saturday afternoons in the months of January, February, and December. Of these lectures and talks, 33, including all of those in Conservatory Range 2, were given by members of the Garden staff. For the remaining 18, outside speakers brought viewpoints and experiences that afforded a pleasing variety to our audiences. The total attendance for the 39 Museum lectures was 3,553, an average of 92 per lecture.

Much instruction has been given to the public on weekday afternoons by our established system of docentry, with Mr. R. S. Williams, Administrative Assistant, and Mr. Percy Wilson, Associate Curator, as the chief guides and demonstrators, and all members of the staff have continued to give out much information in response to numerous inquiries by letter.

Material for study has been furnished to several schools and colleges, and classes in botany, biology, and horticulture, notably from the Evander Childs High School, the Morris High School, the Teachers Training School, and Columbia University, have made frequent visits to the Garden.

The position of Supervisor of Public Instruction, which, chiefly from financial considerations, was allowed to lapse on the retirement of Dr. W. A. Murrill in August, 1924, has not been restored, much of the responsibility in connection with this department of our activities having been assumed by the Assistant Director. It is highly desirable that a Supervisor of Public Instruction be appointed in the near future, both to expand this feature of our work and to relieve members of the staff of cares that have been superimposed on their primary duties.

The serial publications of the Garden during the year 1925 included twelve numbers of the monthly *Journal,*

six numbers of *Mycologia*, four parts of *Addisonia*, one part of *North American Flora*, one number of the *Bulletin*, and sixteen numbers of *Contributions*. The very considerable amount of publication by the Garden would amply justify the appointment of an Editor to give his whole attention to this important department of the Garden's activities. This would relieve the Assistant Director of the care of the *Journal* and the Bibliographer of at least a part of the time-consuming labor that he has for many years devoted to editing *Addisonia* and *North American Flora*. It should aid materially in bringing to completion the important *North American Flora*, with its proposed thirty-four volumes, now about one-fourth finished, and would facilitate the publication of an authorized volume of the *Memoirs*.

The additions to the permanent and duplicate collections of the Museum and Herbarium amounted to 28,208 specimens during the year. The most notable of these accessions was the herbarium of the late Eugene P. Bicknell, who was for ten years one of the Scientific Directors of the Garden. This important collection of plants, which is remarkably rich in representatives of the local flora, was generously given to the Garden by Mrs. Bicknell after the lamented death of her husband, which occurred last February.

Dr. Marshall A. Howe, Assistant Director, has continued to assist in administration and served as Acting Director for eleven weeks during the absence of the Director-in-Chief in Porto Rico. He has looked after the herbarium collections of Algae and Hepaticae, has acted as editor of the monthly *Journal* and the occasional *Bulletin*, and has assumed most of the duties of the lapsed staff-position of Supervisor of Public Instruction. It would be desirable to relieve the Assistant Director of some of this responsibility by new appointments, as already indicated. During the year, Dr. Howe has pub-

lished papers on dahlia culture and on some fossil Algae of Montana, the latter in coöperation with Dr. Goldman of the United States Geological Survey.

Dr. John K. Small, Head Curator of the Museums and Herbarium, has made two exploration trips during the year, one of them extending from the southern extremity of peninsular Florida to El Paso, Texas, the other to Florida alone. In both of these expeditions he has continued to enjoy the generous coöperation of Mr. Charles Deering. Dr. Small has kept on with his critical studies of the herbarium specimens obtained by himself and others in the southeastern states during the past ten years and also with his studies of extensive living material of Iris, Hymenocallis (spider-lilies), and other genera secured by him. Some of the results of these studies are embodied in eighteen papers published by him during the year.

Dr. P. A. Rydberg, Curator, spent two months in the field during the summer, making collections and studies of the higher plants in the mountains of Virginia, West Virginia, Tennessee, and North Carolina. In addition to supervising the entry of a great number of specimens in the main herbarium, he has found time to publish the results of some of his studies of plants of the vetch tribe and to prepare manuscripts on certain genera of the Compositae for *North American Flora.*

Dr. H. A. Gleason, Curator, has continued the study and arrangement of a large amount of herbarium material from northern South America and has published several papers, in which four genera and about seventy-five species hitherto unknown to science have been described. His investigations have been in coöperation with the Royal Botanic Gardens, Kew, England, the United States National Museum, and the Gray Herbarium of Harvard University.

Dr. Fred J. Seaver, Curator, has remained in charge of the fungus herbarium and has continued to edit *Mycologia,* our bimonthly serial that is devoted to the publication of papers on the fungi. With the assistance of other students of the fungi, he has completed and sent to the printers a manuscript on the fungi of Porto Rico for inclusion in the "Botany of Porto Rico and the Virgin Islands," now being published under the auspices of the New York Academy of Sciences, with the coöperation of The New York Botanical Garden, the Insular Government of Porto Rico, etc.

Mr. Percy Wilson, Associate Curator, in addition to his work in determining and distributing tropical American plants from various localities, continued his coöperation with the Director-in-Chief in preparing the manuscript of the Botany of Porto Rico and the Virgin Islands, which is now approaching completion, so far as the higher plants are concerned. He has also continued studies of the plants of Cuba and Trinidad.

Mrs. Palmyre de C. Mitchell, Associate Curator, devoted her attention to sorting and distributing specimens for both the general and the local herbarium, to arranging and sending out duplicate material, to making a preliminary arrangement of the recently acquired Bicknell herbarium, and to preparing various devices for making the collections more readily accessible and useful. During the first part of the year, she also assisted in the Library.

Dr. A. B. Stout, Director of the Laboratories, has continued his important studies of sterility and fertility in plants, based especially on the day lilies, the true lilies, the irises, and certain fruit trees. In his studies of the true lilies, Mrs. Mortimer J. Fox has again afforded practical assistance. His investigations of the pollination requirements of fruit trees and his experiments with breeding seedless types of grapes have been carried on at

Geneva, New York, in coöperation with the State Agricultural Experiment Station. In late winter and early spring, Dr. Stout spent two months in Florida, continuing and extending his studies of flower behavior in avocados, begun in California two years earlier. In coöperation with the Oxford Paper Company, he has made definite progress in breeding experiments with poplars, obtaining more than 5,500 seedling hybrids, involving crosses between thirty different species.

Work on the collection of books purchased from Geneva in 1923 and referred to in two previous reports has been continued under the direction of Dr. John Hendley Barnhart, Bibliographer, and Miss Sarah H. Harlow, Librarian. More than 3,500 volumes have been accessioned and only a few hundred remain to be added to the Garden's library. Besides adding many volumes that were entirely new to our collection of books, this notable purchase has enabled us to return a great number of volumes that had been deposited in our library by agreement with Columbia University.

Dr. Arthur Hollick, Paleobotanist, has completed his studies of the Pleistocene flora of the Kootenay Valley, British Columbia, and has investigated fossil wood unearthed at a considerable depth in the southern part of Manhattan Island and fossil plant remains from Porto Rico. The months of April, May, and June, he spent in Washington, on leave of absence, engaged in work on the fossil flora of Alaska in coöperation with the United States Geological Survey.

Mr. Robert S. Williams, Administrative Assistant, has been active in docentry work, has given considerable attention to the herbarium collections of mosses and lichens, and has published several papers during the year, chiefly on South American mosses.

Such time of the Director-in-Chief as has been available outside of administrative duties has been mainly de-

voted to curatorial work, to continuation of studies of the flora of the West Indies and of northern South America, especially to the native and cultivated plants of Porto Rico, the Virgin Islands, Trinidad, and Cuba, and, in coöperation with Dr. J. N. Rose of the United States National Museum, to the preparation of monographs of the Mimosa Family and the Cassia Family for "North American Flora."

The City appropriation for maintenance of grounds, buildings, and collections has been advanced from about $208,000 in 1925 to $225,000 for 1926, permitting increase in expenditure for labor and increased remuneration of nearly all subordinate employees.

I append reports, giving further details as to maintenance, development, and instruction, by Dr. Small, Head Curator; by Dr. Stout, Director of the Laboratories; by Mr. Boynton, Head Gardener; by Dr. Barnhart, Bibliographer; by Miss Harlow, Librarian; by Mr. Corbett, Superintendent of Buildings and Grounds; by Dr. Hollick, Paleobotanist; by Mrs. Britton, Honorary Curator of Mosses; by Dr. Rusby, Honorary Curator of the Economic Collections; and by Dr. Denslow, Honorary Custodian of the Local Herbarium.

Respectfully submitted,

N. L. Britton,

Secretary and Director-in-Chief

REPORT OF THE HEAD CURATOR OF THE MUSEUMS AND HERBARIUM

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF:

Sir: I submit herewith my report as Head Curator of Museums and Herbarium of The New York Botanical Garden for the year 1925.

The several collections under my supervision were conserved as in the preceding year and developed according to the means provided.

Additions to the museum and herbarium resources were made as follows:

By gift and purchase	11,701	specimens
By exchange	6,250	"
By exploration	10,257	"

Thus a total of 28,208 specimens was added to the permanent and duplicate collections. The specimens represent a wide geographic range. The most valuable additions—those bearing directly on the investigations now in progress at the Garden—were from northern South America, Central America, Mexico, North America, and the West Indies. Eastern Asia, Europe, and Australia are also represented in the accessions.

The largest single accession was the Bicknell Herbarium[1] which was accumulated by the late Mr. E. P. Bicknell and was presented to the Garden by Mrs. Bicknell.

About 1,500 duplicate specimens were sent to other institutions in exchange.

MUSEUMS

In the Economic Museum various new specimens were interpolated and new labels were furnished in some of the cases. The economic collections were under the su-

[1] See Journal of The New York Botanical Garden 26: 193–195. 1925.

pervision of Dr. H. H. Rusby. For details see the report of the Honorary Curator of the Economic Collections.

In the Systematic Museum: (a) the synoptic collection was improved by the addition to some of the plant families, (b) the local flora collection was increased by specimens in the lower groups, (c) the plant picture collection remained as it was last year, (d) the microscope exhibit was varied by the change of some of the objects under the lenses. The cases and exhibits formerly in the east wing were moved into the east hall, thus making room for the herbarium equipment which is to occupy the east wing.

In the Fossil Plant Museum specimens from the North American mainland, the West Indies, and Asia were added. The fossil collections were under the supervision of Dr. Arthur Hollick. For details see the report of the Paleobotanist.

HERBARIA

The specimens added to the permanent collections were drawn from the bulk received during the year and from the unmounted accumulation of former years, as was dictated by the needs of the investigational work in progress.

A total of 20,000 herbarium sheets was used. These represent about a total of 30,000 specimens incorporated in the permanent collections. They were divided between the general Garden herbarium, the local flora herbarium, and the Columbia University herbarium.

The local flora herbarium was under the supervision of Dr. Herbert M. Denslow. For details see the report of the Honorary Custodian of the Local Herbarium.

The moss herbarium was under the supervision of Mrs. N. L. Britton. For details see the report of the Honorary Curator of Mosses.

Some details of the activities of members of the scientific staff are referred to in the several items under

in which the more important and valuable researches and published results are mentioned.

Dr. P. A. Rydberg, Curator, was in charge of the herbarium of flowering plants. His main routine work was the naming of plants sent in for identification, the sorting and selecting of specimens for mounting, and the distribution of mounted specimens in the herbarium cases. As much time as possible was devoted to taxonomic work on the genus *Astragalus* and to a study of the flora of the prairie and plain region of the western central States. A large amount of manuscript—treatment of genera of Carduaceae—for *North American Flora* was put in the hands of the editors. Dr. Rydberg spent two months collecting plants in the mountains of Virginia, West Virginia, Tennessee, and North Carolina. About 3,000 specimens were secured. A report on the field work is being prepared, and will be printed in the *Journal* of the Garden. Dr. Rydberg published "Notes on Fabaceae"—IV–VI, and "Some Extinct or Lost and Rediscovered Plants"—I–II, and assisted in the instruction of visiting classes of pupils from various schools.

Dr. H. A. Gleason, Curator, continued the organization of the large accumulations of herbarium material from northern South America. The chief scientific result of his activity was the publication of eight taxonomic papers, describing four new genera and about seventy-five new species, mostly among the Lobeliaceae and Melastomataceae. He also published two papers on ecology and five short papers of miscellaneous nature. Dr. Gleason assisted in the instruction of visiting classes of high-school pupils and delivered four lectures in the regular Saturday afternoon courses.

Dr. Fred J. Seaver, Curator, since Dr. W. A. Murrill's retirement, took charge of the entire fungus herbarium. A large quantity of accumulated material was sorted and

mounted, and fresh guide-labels supplied for many of the herbarium cases. In connection with this work a careful inventory was made of our collection of plant rusts, which was found to comprise 37,378 specimens in packets. This is probably the largest rust collection in America with the exception of the Arthur Herbarium at Purdue University. In addition to curatorial work, Dr. Seaver was appointed official editor of *Mycologia* at the beginning of the year. Six numbers of this journal were published. The volume comprised 276 pages, 26 plates, and 7 text figures. The manuscript on the "Mycology of Porto Rico and the Virgin Islands" was completed and is now in the hands of the printers. In this work Dr. Seaver was assisted by Dr. L. O. Overholts, of the Pennsylvania State College; Professors H. H. Whetzel and F. D. Kern, of Cornell University and Pennsylvania State College, respectively, and by Mr. R. A. Toro, of Porto Rico. Dr. Seaver gave three lectures on Saturday afternoon course, assisted in the instruction of visiting school children, and devoted some time to the work connected with the elimination of destructive insects. A number of smaller papers were published during the year and research work on various groups of Ascomycetes was continued.

Mr. Percy Wilson, Associate Curator, along with his studies on tropical American plants, continued his work in coöperation with you, especially on the flora of Porto Rico and the Virgin Islands. The seventh part of the interpretation of the flora of those islands is now nearing completion. Mr. Wilson also named and distributed many West Indian plants received from various sources. Owing to the large number of visitors and pupils from both public and private schools, Mr. Wilson's work as docent was greatly increased. During the summer months he gave special attention to developing the collections in the Herbaceous Grounds.

Mrs. William Mitchell, Associate Curator, devoted her attention to sorting duplicate specimens and to sorting

and distributing mounted specimens into the herbarium cases. She also spent much time in renovating various families in the flowering-plant herbarium and renewing and keeping up to date the various kinds of guide-labels, and in listing, checking, and returning to their cases loans of specimens. Mrs. Mitchell devoted much time to the sorting and distribution of the specimens of the local flora herbarium and to preparing various devices for rendering the collection more useful. She also made a preliminary arrangement of the Bicknell Herbarium—the families numerical (Engler & Prantl sequence) and the genera alphabetical—and in the early part of the year helped in the Library.

The undersigned, in addition to curatorial details and routine, devoted all the available time to botanical investigations, some of which are referred to in the following items: (a) to organizing the herbarium material collected by him during the past decade, so that the specimens could be studied and distributed into the permanent collections; (b) to studies in the living collections of *Iris*, *Hymenocallis*, and miscellaneous plants accumulated during former explorations and through a correspondent in southern Texas, Robert Runyon. Many specimens flowered and were painted by Miss Eaton, Artist, as subjects for future illustration in *Addisonia*; (c) to making two outdoor duplicate plantings, with the assistance of Mrs. Wheeler H. Peckham, of the iris plants from the Southern States, which were formerly installed in cold-frames; (d) to an intensive study of the flora and plant-geography of the southeastern States and the beginning of a taxonomic and geographic interpretation of the vegetation; (e) two exploration trips were made to Florida, through the coöperation of Mr. Charles Deering, where studies were continued both in the field and in the Deering reservations at Buena Vista and at Cutler. During the spring trip the field-work was extended from Florida through

the low country of the Gulf States as far west as El Paso, Texas, thence back to Florida through Oklahoma and Arkansas and the upper country of Louisiana, Mississippi, and Alabama. By these excursions much valuable herbarium and living material, and many photographs, as well as much information, were added to our resources. Information resulting from former field-work and from some of the activities enumerated above furnished material for eighteen articles which were printed during the year.

Respectfully submitted,

JOHN K. SMALL,

Head Curator of the Museums and Herbarium

REPORT OF THE HEAD GARDENER

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to present herewith my report for the year 1925.

HORTICULTURAL OPERATIONS

The gardening staff under the direction of Messrs. John Finley and H. W. Becker, Foremen Gardeners, consisted of 27 gardeners and 14 laborers. The outside force, under direction of Mr. Finley, after finishing the winter tree work, spent the major part of the season in flower garden work. New Chrysanthemum, Phlox, rose, tulip, Narcissus, and Hemerocallis plantings were made.

The naturalizing of daffodils was continued along the road to the Southern Boulevard Entrance, some 14,000 bulbs being planted under the direction of Mrs. Wheeler H. Peckham, who, with the aid of Mr. R. S. Sturtevant and Mr. John C. Wister, supervised the replanting of the Iris Garden, our force planting the 15 old beds according to their plans of a color scheme for the American Iris Society. The old tulip display beds were prepared and planted with 36,000 bulbs, the Conservatory Court beds with 20,000, two new borders made and partially planted according to plans of Mrs. Robert C. Hill. 13 trees were planted along roads and paths, 46 trees were planted in the Pinetum, 80 trees were planted in the Arboretum, 248 shrubs were planted in the Fruticetum, 88 Hibiscus were planted around the Lake. There were 52 specimens planted in the Dwarf Collection, and a new plantation of late-blooming shrubs was begun by placing 9 Witch-hazels, 9 Sweet Pepper Bush and 4 Rose of Sharon specimens.

GREENHOUSE OPERATIONS

The greenhouse force under the direction of Mr. Becker has maintained the indoor collections as usual.

The plants in House No. 6, Range No. 1, consisting of century plants, African desert plants, and cacti, were removed, renovated, and replaced, pending the reglazing of the dome. Those in House No. 10 were removed while the new concrete benches were being placed and in House No. 13 the collections were renovated and the vines changed after the repairs to the glass work.

1,203 plants, including 300 Chrysanthemums, 60 Primulas, 150 Begonias, 175 Pelargoniums, 153 Fuchsias, 125 Hippeastrums, 50 Hydrangeas, 50 Solanums, 40 Gloxinias, 40 Impatiens, and 60 stocks, were grown for exhibition in the Central Display House. The feature exhibition was the Chrysanthemum show, the 60 varieties given by Elmer D. Smith & Co., Adrian, Michigan, being especially fine. An increasing number of seedlings were raised for systematic collection, for the Rock Garden, for the Flower Gardens, and for the Nurseries, as well as plants for Dr. Small's studies of native irises, for Dr. Stout's researches, and several thousand bedding plants.

SYSTEMATIC PLANTATIONS

Herbaceous Grounds. Dr. E. B. Southwick and Mr. Percy Wilson have added 300 species of plants to the herbaceous collection this year, through seeds, gifts, and collections, these distributed over about 75 families. With these additions this collection now contains about 1,250 species; these added to those of the Rock Garden, Flower Gardens, and Nurseries, give the Garden a collection of nearly 3,200 species of herbaceous plants.

Woody Collection. 65 species of hardy woody plants new to our collections were raised from seed this year, increasing the plants in the nursery available for these collections by about 374.

Conservatories. About 23,893 plants are now in our greenhouse collection, including 8,769 at Range No. 1, 9,627 at Range No. 2, and 5,497 at Propagating Houses.

90 varieties of water-lilies, 600 plants, were shown in the Conservatory Court.

MISCELLANEOUS COLLECTIONS

Rose Garden. 700 hybrid tea and hybrid perpetual, 996 polyantha, and 4 climbing roses for replacements, also 10 new varieties, were added to the Garden this year by Bobbink and Atkins, of Rutherford, N. J. The Garden now contains 4,500 plants of 280 varieties.

Dahlia Garden. 350 varieties represented by 850 plants were grown in the Dahlia Border, under the direction of Dr. M. A. Howe.

Iris Garden. The Iris collection contains now about 1,000 varieties, 3,000 plants, including the alphabetical and the nursery collection. 400 plants of American native Irises, collected by Dr. Small and others, were added to the collection.

Narcissus Collection. The Dutch Bulb Exporters' Association donated to the Garden a collection of Narcissus numbering 14,200 bulbs. This gift, together with other kinds given by Mrs. W. H. Peckham and purchased through the Narcissus Fund, and including those planted a year earlier, gives a display for 1926 of some 61,200 daffodils, 146 varieties, in massed and naturalistic planting. Mrs. W. H. Peckham planned and supervised this planting and gave other varieties, unsuitable for this location, to the Rock Garden.

Hyacinth Display. 6,000 hyacinths, in 6 varieties, were in bloom this spring and were admired by the public. They were given by the Dutch Bulb Exporters' Association, and were planted along the terrace east of Range No. 1.

Gladiolus Collection. The Gladiolus collection now contains about 15,000 bulbs in about 70 varieties.

Variegated Plant Collection. 68 varieties, 550 plants, were displayed in the variegated plant bed.

Hardy Chrysanthemum Collection. 95 varieties, 1,086 plants, were grown for this display. There were 220 plants in 22 varieties given by Bobbink & Atkins, and 216 plants in 19 varieties given by the Chas. H. Totty Company for this collection. An increasing interest in this collection was shown by people all over the country.

Peony Collection. This collection now contains 166 varieties, 427 plants.

Phlox Collection. This collection contains 24 varieties, 276 plants, of which 200 plants in 18 varieties were given by Bobbink & Atkins, Rutherford, N. J.

Lilac Garden. The Lilac collection consists of 560 plants of 186 named varieties.

Canna Collection. 1,500 plants, 60 varieties, were displayed in the Canna collection.

Tulip Display. 36,000 in 80 varieties given by the Dutch Bulb Exporters' Association and 11,399 in 55 varieties given by John Scheepers, Inc.

Coleus Collection. This collection consisted of about 3,500 plants in 10 varieties and was planted along the terrace east of Range No. 1.

Mallow Collection. This collection remains the same as last year.

Rock Garden. 500 species of plants were set out in the Rock Garden in 1925 under the direction of Dr. E. B. Southwick. Mrs. W. H. Peckham presented many bulbs of Narcissus, Crocus, Colchium, and other genera. These together with mass planting of Sedums, Sempervivums, and quantities of plants raised by Dr. Southwick from cuttings, made the Rock Garden a great attraction to visitors.

Dwarf Collection. This collection contains 52 plants in 25 varieties.

LABELING, RECORDING, AND HERBARIUM

Under the direction of Mr. John Hartling, Head Gardener's Assistant, with one label boy, a total of 3,231

labels have been made and placed, including 102 for the Fruticetum, 120 for the Arboretum, 80 for the Pinetum, 347 for the Horticultural Grounds, 17 for the Dwarf Collection, 729 for Conservatory Range No. 1, 338 for Conservatory Range No. 2, 471 for Conservatory Beds, 300 for Herbaceous Grounds, 80 for the Iris Garden, 90 for the Rock Garden, 280 for the Dahlia Border, 74 for the Rose Garden, 233 for Roads and Paths, 2,000 pot labels painted, 3,190 labels made for stock, and 40 signs were painted. Accession numbers 54,815 to 56,243 have been recorded, making a total of 1,428 accessions for the year. 4,032 packets of seed were received, 264 by gift, 2,415 by exchange, 656 by purchase, 697 by collection. 62,501 bulbs were received, and 5,279 plants, of the latter 935 were by gift, 1,189 by collection, 1,407 by exchange, and 1,748 from seed. 175 specimens were added to the herbarium of cultivated plants.

This department has collected material for schools, nature study, and college classes in botany and exchanged living plants with institutions and parks.

LECTURES

I have delivered five lectures in the regular courses and 12 radio talks from station WEAF, New York City.

Respectfully submitted,

KENNETH R. BOYNTON,

Head Gardener

REPORT OF THE DIRECTOR OF LABORATORIES

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to submit the following report for the year 1925.

GENERAL MATTERS

During the past year the routine duties incident to the general activities of the Garden have been performed, Miss Hester M. Rusk has continued as Technical Assistant, and Mrs. Jean Kerr has continued to assist voluntarily in certain projects of research. No special changes have been made during the year in providing facilities for research but certain of these are in mind for your consideration.

PERSONAL INVESTIGATIONS

My personal research continues to be concerned chiefly with problems of sterility and fertility and may be reported briefly under the major projects as follows:

Investigations with species of Lilium. This research, fully outlined in the *Journal of The New York Botanical Garden* (23: 155–158), has now been in progress for nearly ten years. The lilies have been excellent material for the study of sterility. Much has been learned regarding the possibilities of hybridization in lilies and of the proper culture for seedlings. The difficulties which certain of the lilies present in ordinary culture have become rather clearly defined.

The studies of the past year have been largely concerned with seedlings of our own rearing, a considerable number of which have been grown to blooming age in out of door culture. Over 300 of these have now been allotted for display planting.

The attempt made to force native lilies for the flower show last March met with failure. For display at the flower show next March we are now attempting to force

bulbs of *Lilium regale* kindly donated for this purpose by Mr. C. P. Horsford and bulbs of *L. croceum* and of *L. davuricum* purchased from funds supplied by Mrs. Mortimer J. Fox.

Special effort should perhaps now be made to grow for display in our border plantings a considerable number of at least 15 different species of lilies most suitable to general garden culture. The bulbs of various species could now be furnished for the experimental studies.

No group of floricultural plants needs more careful and scientific study than do the lilies and particularly in regard to the parasites and diseases which seriously affect them.

Investigations with day lilies. Very satisfactory results are now being had in the experimental studies with the various day lilies (*Hemerocallis*). They have been especially favorable for the study of sterility involving incompatibility, both self and cross, in fertilization. Many new types, possibly of horticultural value, are being developed through hybridization. A general report of these results have recently been published (Jour. N. Y. Bot. Gard. **26**: 169–178) and other reports will appear later.

Other studies of sterility and of variegation are being carried on with plants of *Pelargonium, Linaria, Brassica, Abutilon,* and *Ligularia,* and in the growing of these the facilities of the experimental greenhouse are being fully utilized.

Investigations at the State Experiment Station. With your permission I am continuing to coöperate with the State Experiment Station at Geneva, N. Y., in (a) the breeding for seedless types of grapes and (b) in studies of the pollination requirements of certain of the important cultivated fruits. For the pollination studies of the past season the Experiment Station constructed tents to enclose entire trees of the Bartlett Pear, the Black Tar-

tarian Cherry, and the Cortland Apple. Thus far it has been difficult to secure viable pollen of the *vinifera* seedless grapes for use in breeding. If plans to secure such pollen succeed, this breeding will be greatly facilitated.

Further studies of the flower behavior of avocados. It was with considerable personal pleasure that I was enabled to spend February and March in Florida in continuing and extending the studies with avocados which I began in California in the spring of 1923. The expenses incurred in this investigation were met by Dade County through its Farm Bureau. The County Agent, Mr. J. S. Rainey, various officers of the Florida Avocado Association, and numerous growers of avocados, especially Mr. W. J. Krome of Homestead, Florida, coöperated very fully. Mr. E. M. Savage and Mr. T. Ralph Robinson of the U. S. Department of Agriculture coöperated. Mr. Savage assisted throughout most of the period of the investigation. A full report of these studies is now ready for publication.

The investigations with poplars. This research, undertaken in coöperation with the Oxford Paper Company, has yielded some very definite results. Rapid progress is being made in the various projects, especially in the breeding of poplars. In the year's work, over 5,500 seedling hybrids were obtained, involving crosses between thirty different species. These and other results will be reported in detail in due time. Mr. E. J. Schreiner continues to devote all his time to this research. Assistance, labor, and materials have been liberally supplied by the Oxford Paper Company as needed.

STUDENTS AND SCHOLARSHIPS

Special mention should be made of the fact that the American Iris Society appropriated, last spring, funds for two scholarships to be devoted to the studies of the sterilities in the irises. These scholarships were granted

to Miss Louise Cover and Miss Marjorie Swabey, who worked most industriously on the problem throughout the season of the blooming of the irises. A report of these studies is now published.

During the year the following persons have been formally registered for research at the Garden either as students or as recipients of scholarships.

Cover, Louise A., Sterilities of Irises.
Degener, Otto, Systematic Botany.
Jacot, Arthur Paul, Systematic Botany.
Moore, Clarence E., Plant Breeding.
Overholts, Lee O., Mycology.
Pope, Gladys A. Systematic Botany.
Schreiner, Ernest J., Research with Populus.
Smith, Albert C., Taxonomy of Ferns.
Swabey, Marjorie, Sterilities of Irises.
Toro, Rafael, Mycology.
Varrelman, Ferdinand A., Plant Breeding.
Wodehouse, Roger P., Studies with Pollen.

Respectfully submitted,

A. B. Stout,

Director of the Laboratories

REPORT OF THE BIBLIOGRAPHER

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to submit the following report for the year 1925.

Work on the collection of books purchased from Geneva in 1923 has been continued, but is not yet completed. More than three thousand volumes have now been accessioned; only a few hundred remain to be added to the library.

Of *North American Flora* only one part has been issued during the year: volume 7, part 10, in September; another part of the same volume is in press. With volume 7, which is nearing completion, and the work on the Geneva book-purchase out of the way, work on *North American Flora* should proceed much more rapidly, but editorial assistance could be utilized advantageously. Four parts of *Addisonia* have been published during the year: the concluding number of volume 9, and three of volume 10.

In addition to the routine work pertaining to his office, the Bibliographer has given three lectures in the Garden courses on Saturday afternoons.

Respectfully submitted,

JOHN HENDLEY BARNHART,

Bibliographer

REPORT OF THE LIBRARIAN

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to submit the following report for the year 1925.

No census of the library was made this year but the records furnish the following statistics with regard to the bound volumes. There were acquired by gift 41 in addition to 23 given by Mr. N. T. Kidder in 1917 and not hitherto accessioned; by exchange, 26; and by purchase, 64. Of the Geneva purchase made in 1923, 1,555 volumes were accessioned during the past year. There have been bound 490 volumes, including 17 belonging to Columbia University, and many items of the Geneva purchase. The total number of accessions was thus 2,199.

Owing to the crowded condition of the stacks, it was decided that, if agreeable to Columbia, we would return a part of their books which were duplicated in the Garden collection. Accordingly, a list was submitted to them in October and upon their authorization and in accordance with the agreement between the two institutions dated January 8, 1896, 1,860 bound volumes were withdrawn, listed, and packed ready for shipment. This leaves a balance of 339, which, added to 33,636, the census numbers for 1924, makes the approximate number in the library to be 33,975.

It seems fitting here to express our thanks to Columbia for the use of their books during these past years. Many of them have been of invaluable aid in the carrying on of our work.

Among the gifts received during the past year should be mentioned the botanical library of the late E. P. Bicknell, Esq., and a large collection of books, pamphlets, serials, and documents presented by Dr. F. H. Blodgett. Among the notable purchases was that of 16 Linnaean

dissertations, making our set of the botanical series now complete with the exception of three.

The leading accessions have been listed in the *Journal* as heretofore.

There have been added to the catalogue 3,212 typewritten and 2,457 printed cards, the latter issued by the Torrey Botanical Club.

The following additions and corrections should be made to the list of serials as appended to the report of the Librarian for 1921 (Bulletin **12**: 41–61) and supplemented in the reports for 1922 (**12**: 139), 1923 (**12**: 211, 212), and 1924 (**13**: 33).

Omit the following:

Butantan. Instituto Butantan: Seccão de Botanico, S. Paulo, Brazil. *Anexos das Mémorias.*

Change the following:

Christiania. Hortus Botanicus, Christiania, Norway, to Oslo. Hortus Botanicus.

Garden Magazine, New York, N. Y., to Garden and Home Builder.

Add the following:

*Archiv für wissenschaftliche Botanik, Berlin, Germany.

Archivos de botanica de Estado de S. Paulo, S. Paulo, Brazil.

Economic geography, Worcester, Mass.

Jalta. Jardin Botanique de Nikita, Jalta, Russia. *Bulletin de l'Herbier, Delectus Plantarum exsiccatarum, Delectus Seminum.*

Montevideo. Museo Nacional, Montevideo, Uruguay, *Anales.*

Royal Dublin Society, Dublin, Ireland. *Scientific Proceedings.*

Societas Zool.-Botanica Fennica Vanamo, Helsinki, Finland, *Annales.*

Société Polonaise des Naturalistes "Kopernik," Lwów, Poland. *Botanical Papers from "Kosmos."*

Zagreb. University, Botanical Institute, Zagreb, Jugo-Slavia. *Acta Botanica.*

Zeitschrift für Pilzkunde.

Zionist Organization. Agricultural Experiment Station, Tel Aviv, Palestine, *Bulletin.*

Respectfully submitted,

SARAH H. HARLOW,

Librarian

REPORT OF THE SUPERINTENDENT OF BUILDINGS AND GROUNDS

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to submit the following report for the year 1925.

REGULATING AND GRADING

There has been considerable regulating and grading of roads and paths in the Garden during the past year.

Both sides of the main drive from the South Gate to the northern entrance and of the west drive from 200th Street to the circle above the lakes were regulated and graded, for which work 2,000 yards of top-soil were used. This soil was supplied by contract with the Park Department. The two above-mentioned drives have been rebuilt completely. Both sides of the path leading from the Iris Garden to the picnic grounds and of the path leading from the Rose Garden to the southeastern entrance have been regulated and graded.

Contractors working in the vicinity of the Garden who were seeking a suitable place to dispose of soil taken from excavations have been carting such soil into the Garden at their own expense. During the past year they brought in about 14,000 yards of this soil, 12,000 yards of which were placed along the northern and eastern sides of the Long Lake so as to fill in the bottom of the valley, and 500 yards were used to fill in and grade the cellar of the Lorillard Mansion, which had been destroyed by fire. The remainder of this soil, consisting of about 1,500 yards, was placed on the western side of the Bronx River.

DRAINAGE

The catch-basins on both sides of the main drive were raised to meet the change of grade caused by the re-

building of the main drive. A culvert 20 inches wide, 20 inches high and 120 feet long was built on the western side of the Bronx River so as to drain the picnic grounds and the Iris Garden. Two culverts were built under the path through the picnic grounds and two culverts were also built under the path through the oaks at the Large Lake. In order to extend the pipes at the head of the Large Lake, which is being filled in, 36 feet of 20-inch pipe were used.

WATER SUPPLY

The water system in the Museum Building, the Propagating Houses, the comfort stations and the Rose Garden, as well as the drinking fountains throughout the grounds, received all necessary repairs.

PATHS

The main drive from the southern entrance to the northern entrance and the west drive from 200th Street to the circle at the lakes were rebuilt with 6 inches of concrete and two inches of asphalt. A curb 4 inches high was built on both sides of the road in order to protect the grass gutters. In the reconstruction of these roads, 7 extra catch-basins, 42 drop inlets and 1,726 feet of 6-inch tile-pipe were used. The work was completed in fifty working days. All the cross-paths and the paths on the west drive to the Mosholu entrance were raised to meet the grade of the road. A 10-foot path 800 feet long was built and completed from the southeastern entrance to the Rose Garden. Another 10-foot path, 655 feet long, was built and completed in the picnic grounds in the western part of the Garden. The paths in the Iris Garden and through the white and red pine collection, as well as the terrace around Conservatory Range No. 1, were resurfaced and rolled. All the paths in the northern part of the Garden were cleaned and resurfaced.

BUILDINGS

The doors and window sashes in the basement and all the window sashes of the third floor and the east and west wings of the Museum Buildings received two coats of paint. Repairs were made to the copper on the eastern and western sides of the roof of the Museum Building, as well as to all the windows of its roof. Our steam engineers made all necessary repairs to the steam and water systems in the basement of the Museum Building and the carpenters repaired the windows and doors. New shades were put up in all the windows of the basement.

All the glass and sash bars of the roof of houses 6 and 13 of Conservatory Range 1 were replaced and these two houses received two coats of paint. All the 3-inch copper leaders in houses 5, 6, 7, 8, and 13 of Conservatory Range 1 were replaced. The old benches of house 10 were replaced with concrete benches, two side benches 64 feet long, one end bench 10 feet long and a three-tiered center bench. In house 12 one end bench 10 feet long was built. All the loose and broken glass at Conservatory Ranges 1 and 2 were replaced by the painters. Repairs were also made to the sash-bars at the Propagating Houses and all broken glass was replaced; houses 1, 2, 3, and 4 were repaired and received two coats of white paint.

The roofs of the stable and the stone hut were reshingled and the valleys and gutters replaced. The floors of the stalls of the stable were repaired. The fire boxes of five boilers at Power House 1 and of two boilers at Power House 2 were rebuilt.

Repairs were made to the heating systems of the Museum Building, Conservatory Ranges 1 and 2, and to the Propagating Houses by our steam engineers.

GROUNDS

A two-rail fence, 1,512 feet long, was built around Lake A and another two-rail fence, 686 feet long, was built

from the Southern Boulevard Entrance to the Elevated Railway Approach. Around the white-pine collection, 1,200 feet of a two-rail fence and 434 feet of a one-rail fence were put up. Along the path on the northern side of Conservatory Range 1 a one-rail fence, 2,075 feet long, was built. This makes a total of 3,399 feet of two-rail fencing and 2,509 feet of one-rail fencing.

A 6-foot iron boundary fence, 375 feet long, was erected along Pelham Parkway east of the Bronx River. A similar fence, 125 feet long, was erected along the western side of the Bronx River near the Iris Garden entrance. Repairs were made to the cedar fences at the Woodlawn Road Approach and along the Bronx River, as well as to the one-and two-rail iron fences throughout the grounds, wherever necessary. Two coats of paint were given to 525 feet of the fence at the Fordham College boundary, to 700 feet at the Southern Boulevard and to 2,200 feet along Bronx Park East, these fences being 6 feet high, making a total of 3,425 feet.

Ten rustic benches were repaired and the signs and maps put up around the Garden were repaired or replaced wherever necessary. The Propagating Houses were supplied with fuel for about four months from wood cut from dead and fallen trees.

About sixty tons of hay were cut this year and we have also continued the uprooting of poison ivy throughout the grounds.

From May until September, nearly a dozen picnics a week visited the Garden. These parties averaged from about 75 to 1,000 children attending the public and Sunday schools of Greater New York, New Jersey, and Connecticut, who were escorted to the picnic grounds set aside for these groups by our special guards detailed there daily.

Four uniformed police officers were assigned to the Garden daily during the hours from ten in the morning

until six at night, from May of this year. On Sundays and holidays these officers were assisted by two additional officers in civilian clothes. Twelve guards were selected from the laborers and gardeners to aid our own keepers in patroling the Garden on Sundays and holidays. Nearly 300 summonses were served by the police officers for violations of park ordinances and the offenders were fined from one to twenty-five dollars in the magistrates' courts.

On Saturdays, Sundays, and holidays during the summer months, about 50,000 visitors came to the Garden, but during July and August this number was greatly increased.

The damage to the plantations was very small because of the vigilance of our employes. Special guards were assigned to the rose, gladiolus, and dahlia collections twenty-four hours a day because of the growing number of visitors to these collections.

Respectfully submitted,

ARTHUR J. CORBETT,

Superintendent of Buildings and Grounds

REPORT OF THE HONORARY CURATOR OF THE ECONOMIC COLLECTIONS FOR THE YEAR 1925

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to submit the following report of the economic collections under my care for the year 1925.

There have been no large or important additions to these collections during the past year. Attention has been limited to the installation and recording of such occasional additions as have come to hand, in completing old collections, and the records of many already installed, as new information concerning them has come to hand, and in planning for the future. The necessity for extensive printing of labels of a more informative character than many of those now possessed has been so often pointed out, that mere reference to the subject is called for here. At the present time, we possess no adequate means for carrying out this important undertaking, but it is fully provided for in the elaborate plans for extension and reorganization that have been published by President Lee. Hardly less important are the plans in contemplation for a new class of exhibits, intended to convey information regarding the manner in which crude vegetable products are brought into usable form and condition. These matters have been discussed at length with President Lee and others, and I eagerly await the time when such improvements can be introduced into our Economic Museum.

As was the case in 1924, so during the past year, my available time has been directed chiefly to the study of the Bolivian plants collected on the Mulford Expedition of 1921–1922. More than two hundred new species and

several new genera have been studied and described, and the results are expected to be published early in the coming year. The completion of this work will enable me to determine many doubtful points regarding the economic materials collected on that Expedition.

Respectfully submitted,

H. H. RUSBY,

Honorary Curator of the Economic Collection

REPORT OF THE PALEOBOTANIST

Dr. N. L. Britton, Director-in-Chief.

Sir: I have the honor to report as follows upon paleobotanical matters which have received my attention during the year 1925.

From April 8 to July 1, I was in Washington, D. C., on leave of absence, engaged in work on the fossil flora of Alaska for the United States Geological Survey.

The principal item of work in connection with the Garden has been the continuation and completion of my study of the Pleistocene flora of the Kootenay Valley, British Columbia, based upon specimens transmitted by the Canada Geological Survey. This work is now awaiting publication.

Other investigations have been concerned with examinations of fossil wood and other plant remains from Pleistocene swamp deposits unearthed on Manhattan Island and in Porto Rico. The results of these investigations have been completed and descriptive manuscript has been submitted for publication.

Twenty-four specimens were added to the paleobotanical collections, most of which were acquired as donations and others in return for assistance rendered in connection with their identification and description.

Accessions of paleobotanical literature included thirty-two octavo and eight quarto separates received as exchanges from twenty-six different authors, eight of whom represent new contributors.

On request of Professor M. A. Chrysler, of Rutgers University, a series of nine characteristic species of Carboniferous plants, selected from duplicate material in the Garden collection, was transmitted for educational work, in exchange for herbarium specimens.

In connection with the Garden lecture courses, it was my privilege to speak on "Some plants concerned in the formation of coal," "The Dismal Swamp of Virginia," and "The origin and history of soils," in each of which lectures fossil plants were either directly or indirectly concerned.

Respectfully submitted,

ARTHUR HOLLICK,

Paleobotanist

REPORT OF THE HONORARY CURATOR OF MOSSES

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: During the year a number of interesting collections have been added to the herbarium; notably the mosses from Southern Arizona, collected by E. B. Bartram. These include a number of new species and extend the range northward from Mexico of several others. The National Museum has continued sending mosses for naming, including several small collections from Venezuela, British Guiana, Ecuador, Chile, and Peru, which Mr. Williams has studied. The Botanical Gardens at Berlin have very kindly loaned for study two valuable types of *Orthotrichum* from the Bridel Herbarium and sent 41 specimens of Chilean mosses collected by J. Hallmayer in exchange for some Bolivian duplicates collected by Mr. Williams. A small collection of mosses from the Jardim Botanico at Rio Janeiro, Brazil, made by Miss Maria Bandeira came to us for naming through Dr. Grout. The Field Museum of Chicago has contributed a large set of Peruvian mosses, collected by George S. Bryan which are still being studied. Four sets of Colombian mosses received from the Academy of Natural Sciences in Philadelphia, collected by Doctors Pennell and Killip, have been named and distributed to the subscribers by Mr. R. S. Williams. Our Porto Rican collections have been named and one set of the duplicates sent to the Department of Agriculture in Porto Rico. We have bought from Prof. J. M. Holzinger fascicle no. 22 of his Musci Acrocarpi Boreali Americani. Miscellaneous specimens from various parts of the United States also have been added, numbering in all about 625 packets. There still remain several large collections to be studied; one from Costa Rica and Panama made by Mr. Paul Standley includes 377 packets. He has also sent us specimens from Salvador, Mexico, and Panama.

The lantern-slide collection has been supervised, 73 colored slides and 18 uncolored have been added and 8 in the Stokes loan set; 33 lectures have been given by members of the staff and others and 768 slides have been in use.

Correspondence in connection with the Wild Flower Preservation work has been increasing so greatly that it was decided to confine our work to New York State. Literature, posters, cartoons, and colored illustrations have been sent to many students and teachers, who have also received help and advice. The various state chapters of the Wild Flower Preservation Society have become so active and entirely self-supporting that they no longer need our help. We have shared with them our laurel button and Miss Eaton's colored plates and outline drawings and the Comstock Publishing Company, of Ithaca, is issuing the latter for schools and field notebooks in large quantities at reasonable prices. Miss Mitchell, the President of the Riverside (Illinois) Chapter, has issued sets of 12 colored postal cards from original photographs, half of which were made by L. W. Brownell, an expert photographer of Paterson, New Jersey. These have been issued in large quantities at a very reasonable rate and we are planning to continue with another issue.

The growing of Holly and Winterberry from seed has been successful and many plants are ready for distribution. Letters asking for seed of the Fringed Gentian have been numerous and much exceeded the supply that Dr. Norton and Dr. Stout found available. The supply was exhausted by the end of the planting season in November, but requests have continued all winter and still are coming.

The Hon. Channing T. Moore has introduced a bill at Albany which has passed both branches of the Legislature and has been signed by the Governor, protecting the Dogwood, Mountain Laurel, and Pink Moccasin-

flower or Lady's-slipper. The Arbutus bill was passed last year. We hope that much publicity will do away with the outrageous vandalism to which these beautiful native plants have been subjected and that others will be added to our state laws.

Respectfully submitted,
ELIZABETH G. BRITTON,
Honorary Curator

REPORT OF THE HONORARY CUSTODIAN OF THE LOCAL HERBARIUM

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor of presenting herewith my report for the year 1925 as Honorary Custodian of the Local Flora Herbarium.

The work in the Local Flora Room has been carried on, during the past year, chiefly by Mrs. William Mitchell. Because of a severe though brief illness early in May, the Custodian has been unable to do much collecting or to spend much time on the Herbarium. The Torrey Club trips have yielded comparatively few specimens. Mrs. Mitchell has continued the work of plotting the distribution of species in our Local Area. She has also arranged for convenient consultation the unmounted sheets of the Bicknell Herbarium. It is certain that this contains many duplicate specimens which we shall not wish to incorporate in our collection; but, whenever we are ready to examine and add them, it will become necessary to provide more cases for the Local Herbarium, many of the pigeonholes being uncomfortably crowded already.

The additions during the past year have been 816 sheets; making rather more than 4,000 in the last four years.

Respectfully submitted,
H. M. DENSLOW,
Honorary Custodian

REPORT OF THE CHAIRMAN OF THE SCIENTIFIC DIRECTORS

To the Board of Managers of The New York Botanical Garden.

Gentlemen: The scientific and educational work of the Garden has gone forward with increased effectiveness during the past year and the data are duly recorded in the report of the Director-in-Chief. Plans for the further expansion of the Garden's activities as well as routine matters concerning the research work of the present staff have occupied the attention of the Scientific Directors.

The long-continued exploration and studies by members of the staff on the flora of the West Indies and South America are marked by steady achievement. The botanical and geological survey of Porto Rico supported in part by the insular government is making steady progress toward completion. With the increasing interest in forestry problems, especially those concerned with the hardwood timber supply, the importance of the Garden's work on the tropical forests of the western hemisphere is becoming more and more evident. During the past year the Garden has been able to give useful assistance in connection with a preliminary survey of the timber resources of eastern Cuba, which is now being carried on with the support of various sugar, fruit and railroad companies whose interests are immediately concerned.

As noted in previous reports it is becoming increasingly evident that the Garden should be prepared to render a greatly extended service in connection with the study of the underlying problems of tree breeding, root growth and forest soils, and soil floras, on the solution of which the development of a successful national policy of reforestation will depend.

The need for increased funds to extend the planting of our present forest collections and arboretum as parent

stock for breeding experiments is very pressing since the growing of such breeding stock is a matter of long periods. Dr. Stout's interesting results, in his work with poplars as forest material for the paper pulp industry, emphasize the need of pushing forward at once the fundamental researches in the physiology and pathology of forest trees by which alone the reasonable safety of extensive forest planting can be assured.

Respectfully submitted,

R. A. HARPER,

Chairman of the Scientific Directors

FINANCIAL STATEMENTS

EXHIBIT I

BALANCE SHEET

December 31, 1925

Permanent Fund Assets:			
Investments (Exhibit III)	$1,519,782.04		
Cash awaiting investment	15,846.70		
		$1,535,628.74	
Permanent fund assets expended for current uses (see current fund liability per contra)		49,546.68	
			$1,585,175.42
Current Assets:			
Cash in banks and on hand:			
General purposes	$23,754.95		
Special purposes	7,071.47		
		$ 30,826.42	
Accounts receivable—city maintenance		10,210.83	
Interest and dividends receivable (Exhibit III)		22,538.73	
			$ 63,575.98
Prepaid Insurance Premiums			1,074.99
			$ 64,650.97
Deficiency, representing accumulated excess of current expenditures over income received:			
Balance at January 1, 1925 (after giving effect to transfer aggregating $159,877.19 from permanent funds as authorized by the Board of Managers and Executive Committee, and minor adjustments)		$ 465.52	
Add—Excess of expenditures over income for the year ending December 31, 1925 (Exhibit II)		3,315.79	
			3,781.31
			68,432.28
			$1,653,607.70

EXHIBIT I

BALANCE SHEET

December 31, 1925

Permanent Funds:		
Restricted endowments	$ 154,367.47	
Unrestricted endowments, including unconditional bequests set aside by the Board of Managers as permanent funds	1,413,807.95	
Special endowments with life interests in respect of income therefrom	17,000.00	
Total (Exhibit IV)		$1,585,175.42
Current Liabilities and Special Funds:		
Current liabilities:		
Accounts payable	$ 11,544.13	
Special funds:		
Unexpended income from restricted funds	$2,071.47	
Unexpended income from contributions set aside by the Board of Managers for a specific purpose	5,000.00	
Total (Exhibit V)		7,071.47
Deferred income credits:		
Membership dues paid in advance		270.00
Total current liabilities and special funds	$ 18,885.60	
Indebtedness to permanent funds for expenditures of fund assets for current uses	49,546.68	
		68,432.28
		$1,653,607.70

EXHIBIT II

Statement of Operations for the Year Ending December 31, 1925

	City maintenance	General	Restricted and special funds	Total
Income:				
Income from investments of permanent funds		$64,253.56	$ 7,250.73	$ 71,504.29
Contributions	$207,871.49	3,441.22	5,000.00	216,312.71
Membership dues:				
Annual		13,790.00		13,790.00
Sustaining		475.00		475.00
Sales of plants, duplicate books, etc.		1,389.54		1,389.54
Subscriptions and sales of publications		3,221.20	1,971.07	5,192.27
Total income	$207,871.49	$86,570.52	$14,221.80	$308,663.81
Expenses:				
Maintenance and general expenses:				
Salaries of Director-in-chief, assistants and Garden staff	$142,698.45	$34,291.75	$ 3,600.00	$180,590.20
Wages	12,796.80	21,159.60		33,956.40
Materials and supplies	52,376.24	3,829.47		56,205.71
Stationery, printing, postage, etc.		1,654.50		1,654.50
Interest and exchange		223.38		223.38
Insurance		1,119.43		1,119.43
Miscellaneous		6,745.62		6,745.62
Expenses in connection with increase of endowment and development fund		5,163.61		5,163.61
	$207,871.49	$74,187.36	$ 3,600.00	$285,658.85
Improvements and exhibits:				
Improvements to buildings and grounds		$ 4,922.47		$ 4,922.47
Laboratory equipment purchased		294.82		294.82
Library books, bindings, etc.		1,556.77	$ 708.09	2,264.86
Museum specimens		30.27	187.07	217.34
Plant purchases and expenses		834.53	345.23	1,179.76
Botanical explorations			100.00	100.00
Botanical collections		515.65		515.65
		$ 8,154.51	$ 1,340.39	$ 9,494.90
Education and research:				
Public lectures and instruction		$ 1,431.54		$ 1,431.54
Scholarships, prizes, etc.		250.00		250.00
Publications		5,762.90	$ 3,449.09	9,211.99
Research		100.00	142.85	242.85
Investigation and preservation of native plants			117.02	117.02
		$ 7,544.44	$ 3,708.96	$ 11,253.40
Total expenses	$207,871.49	$89,886.31	$ 8,649.35	$306,407.15
Excess or *deficiency of income over expenses for the year	—	$*3,315.79	$ 5,572.45	$ 2,256.66

EXHIBIT III

Summary of Investments December 31, 1925

	Par value	Approximate market value	Book value	Accrued interest and dividends Dec. 31, 1925	Average yield on basis of book value
General funds:					
Bonds	$ 565,000.00	$ 538,606.75	$ 550,490.11	$ 7,681.66	4.66%
Stocks:					
Preferred	10,000.00	10,612.50	10,227.50	150.00	5.87%
	$ 575,000.00	$ 549,219.25	$ 560,717.61	$ 7,831.66	4.68%
Sage Fund:					
Bonds	$ 570,000.00	$ 541,425.00	$ 510,458.81	$10,028.74	5.23%
Stocks:					
Preferred	55,000.00	58,400.00	48,121.87	—	6.54%
Common	70,200.00	128,760.00	90,825.00	1,620.00	7.73%
	$ 695,200.00	$ 728,585.00	$ 649,405.68	$11,648.74	5.70%
Endowment and Development Fund:					
Bonds	$ 220,000.00	$ 219,462.50	$ 220,158.75	$ 2,708.33	5.22%
Stocks:					
Preferred	60,000.00	72,850.00	72,500.00	350.00	5.79%
	$ 280,000.00	$ 292,312.50	$ 292,658.75	$ 3,058.33	5.36%
Special Trust Fund:					
170 shares All America Cables, Inc. stock	$ 17,000.00	$ 21,930.00	$ 17,000.00	—	7.00%
	$1,567,200.00	$1,592,046.75	$1,519,782.04	$22,538.73	5.26%

EXHIBIT IV

Statement of Permanent Funds Showing Changes During the Year Ending December 31, 1925

	Balance at Jan. 1, 1925	Additions	Deductions	Balance at Dec. 31, 1925
Restricted endowments:				
Endowment for science and education	$ 89,065.49	$ 50.00		$ 89,115.49
Addison Brown Fund	21,149.31			21,149.31
John Innes Kane Fund	10,347.63			10,347.63
Maria De Witt Jesup Fund	25,000.00			25,000.00
Olivia E. and Caroline Phelps Stokes Fund	3,000.00			3,000.00
Charles Budd Robinson Fund	755.04			755.04
The H. H. Memorial Fund		5,000.00		5,000.00
	$ 149,317.47	$ 5,050.00		$ 154,367.47
Unrestricted endowments:				
Endowment Fund	$ 316,047.08	$ 500.00	$ 88,533.54	$ 228,013.54
David Lydig Fund	34,337.86			34,337.86
Students' Research Fund	4,632.00	144.00		4,776.00
William R. Sands Fund	10,000.00			10,000.00
Darius Ogden Mills Fund	48,099.17			48,099.17
Henry Iden Fund	10,000.00			10,000.00
Fanny Bridgham Fund	30,000.00			30,000.00
Francis Lynde Stetson Fund	25,000.00			25,000.00
Russell Sage and Margaret Olivia Sage Memorial Fund	766,198.66	14,684.36	71,343.65	709,539.37
Frances Griscom Parsons Fund	2,000.00	304.67		2,304.67
Endowment and Development Fund	3,000.00	289,101.00		292,101.00
The Charles Patrick Daly and Maria Lydig Daly Fund		19,636.34		19,636.34
	$1,249,314.77	$324,370.37	*$159,877.19	$1,413,807.95
Special endowments:				
The Charles Patrick Daly and Maria Lydig Daly Fund	$ 19,636.34		$ 19,636.34	
Special Trust Fund	17,000.00			$ 17,000.00
	$ 36,636.34		$ 19,636.34	$ 17,000.00
	$1,435,268.58	$329,420.37	$179,513.53	$1,585,175.42

* Transfers to current fund deficiency account.

EXHIBIT V

SPECIAL FUNDS

Statement of Application of Income From Restricted Permanent Funds and Special Contributed Funds Designated for Specific Purposes

	Balance at Jan. 1, 1925	Additions	Expenditures	Balance at Dec. 31, 1925
Restricted Permanent Funds:				
Endowment for science and education:				
Public lectures and instruction, research and publications other than "Addisonia"	$ 270.27	$4,270.36	$4,093.12	$ 447.51
Addison Brown Fund:				
Publication of "Addisonia"	664.59	2,985.11	$3,149.87	499.83
John Innes Kane Fund:				
Plant purchases and expenses	261.34	496.13	312.00	445.47
Maria De Witt Jesup Fund:				
Botanical collections		1,198.69	877.34	321.35
Olivia E. and Caroline Phelps Stokes Fund:				
Investigation and preservation of native plants	174.76	143.83	117.02	201.57
Charles Budd Robinson Fund:				
Exploration	128.06	36.97	100.00	65.03
The H. H. Memorial Fund:				
Development of model gardens		90.71		90.71
	$1,499.02	$9,221.80	$8,649.35	$2,071.47
Special Funds contributed for specific purposes:				
Helen C. Inslee bequest designated by the Board of Managers for construction of Linnaean Bridge Entrance		$5,000.00		$5,000.00

CERTIFICATE OF AUDITORS

We have examined the books and accounts of The New York Botanical Garden for the year ending December 31, 1925, and certify that the attached balance sheet (Exhibit I) and relative statements (Exhibits II to V inclusive) are correctly prepared therefrom, and, in our opinion, set forth the financial position of the corporation as at December 31, 1925, and a summary of the transactions for the year ended on that date.

PRICE, WATERHOUSE & Co.

REPORT OF THE COMMITTEE ON PATRONS, FELLOWS AND MEMBERS FOR THE YEAR 1925

To the Board of Managers of The New York Botanical Garden.

Gentlemen: The number of new members who have qualified is 172. The number of annual members is now 1,502; life members 125; sustaining members 19.

Of the annual members 51 are now in arrears for dues for 1925, 26 for dues for 1924 and 1925, 21 for dues for 1923, 1924, and 1925.

Dues have been collected to the amount of $14,535.

Two persons have qualified as life members by the payment of $250 each. These sums have been transmitted to the treasurer.

A complete list of all classes of members to date is herewith submitted.

Benefactors

*Mrs. Fanny Bridgham,
*Hon. Addison Brown,
*Andrew Carnegie,
Columbia University,
*Hon. Charles P. Daly,
Daniel Guggenheim,
Murry Guggenheim,
*D. O. Mills,
*J. Pierpont Morgan, Sr.
John D. Rockefeller,
John D. Rockefeller, Jr.,
*Mrs. Russell Sage,
*Francis Lynde Stetson,
*Cornelius Vanderbilt.

Patrons

Oakes Ames,
*Miss Catherine A. Bliss,
Dr. N. L. Britton,
*Hon. Addison Brown,
*Andrew Carnegie,
*Mrs. George Whitfield Collord,
*Mrs. Louisa Combe,
*James M. Constable,
Charles Deering,
*William E. Dodge,
James B. Ford,
*George J. Gould,
Edward S. Harkness,
*Mrs. Esther Herrman,

* Deceased.

Frederick Trevor Hill,
Archer M. Huntington,
*Henry Iden,
*Mrs. Helen C. Inslee,
Mrs. John Innes Kane,
*John Stewart Kennedy,
*Mrs. Mary J. Kingsland,
Prof. Frederic S. Lee,
Mrs. Frederic S. Lee,
*J. Pierpont Morgan, Sr.,
*Oswald Ottendorfer,
*Lowell M. Palmer,
*William Rockefeller,
*William R. Sands,
*William C. Schermerhorn,
*James A. Scrymser,
Mrs. Finley J. Shepard,
*Samuel Sloan,
*Mrs. Frederick F. Thompson
*W. K. Vanderbilt,
Mrs. Antoinette Eno Wood.

Fellows for Life

Edward D. Adams,
George F. Baker,
Miss Elizabeth Billings,
Mrs. W. Bayard Cutting,
Dr. Robert W. de Forest,
Cleveland H. Dodge,
James B. Ford,
Daniel Guggenheim,
Murry Guggenheim,
S. R. Guggenheim,
William Halls, Jr.,
Mrs. Stephen V. Harkness,
Mrs. William L. Harkness,
Mrs. John Stewart Kennedy,
Prof. Frederic S. Lee,
Mrs. Frederic S. Lee,
Ogden Mills,
J. P. Morgan,
Mrs. Lewis R. Morris,
E. A. Richard,
Mrs. John A. Roebling,
Mortimer L. Schiff,
Leon Schinasi,
Miss Olivia E. Phelps Stokes,
Charles G. Thompson,
Louis C. Tiffany,
Tiffany & Company.

Life Members

Edward D. Adams,
Dr. Felix Adler,
Mrs. James Herman Aldrich,
Dr. S. T. Armstrong,
Edward W. C. Arnold,
Mrs. Hugh D. Auchincloss,
Dr. John Hendley Barnhart,
George A. Barron,
Aurel Batonyi,
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VOL. 13 No. 48

BULLETIN

OF

THE NEW YORK BOTANICAL GARDEN

ISSUED JUNE 8, 1927

CONTENTS

Reports for the Year 1926

Report of the President 173
Report of the Secretary and Director-in-Chief 181
Report of the Head Curator of the Museums and Herbarium 191
Report of the Head Gardener 197
Report of the Director of the Laboratories 201
Report of the Bibliographer 206
Report of the Librarian 207
Report of the Superintendent of Buildings and Grounds..... 210
Report of the Honorary Curator of the Economic Collections 215
Report of the Paleobotanist 217
Report of the Honorary Curator of Mosses 219
Report of the Honorary Custodian of the Local Herbarium 222
Report of the Chairman of the Board of Scientific Directors 223
Report of the Treasurer 226
Certificate of Auditors 227
Report of the Committee on Patrons, Fellows, and Members 232

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REPORT OF THE PRESIDENT FOR THE YEAR 1926

The campaign to increase the Garden's funds, which was inaugurated by the Board in November, 1924, has been conducted quietly throughout the year and has resulted in securing paid contributions, pledges for early payment, legacies and minor accessions, which together will increase the endowment by the sum of $1,013,000. The two leading donors are Mr. John D. Rockefeller, Jr., with a gift of $500,000, and Mr. Edward S. Harkness, with one of $300,000. Members of the Board and the Advisory Council have contributed one-tenth of the whole amount. The total figure, nearly doubling the endowment of 1924, is gratifying, and demonstrates the wisdom of the Board in authorizing the campaign. The new income thus assured allows provisions in the budget of 1927 for certain long-deserved increases of the salaries of members of the staff, the appointment of additional staff members, and the furtherance of other features of the new plans for development. But the increase of actual funds is only one of the benefits accruing from the campaign; for it has given an opportunity to make widely known the Garden's aspirations, and increase the public respect for it and the public confidence in its future. The main lines of its further development have already been decided upon. Their realization demands the continued generosity of the city government, and ever increasing assistance from an appreciative and generous public. The campaign to obtain at first $4,160,000, as authorized

in 1924, and ultimately $7,000,000, must be continued. Approximately one-quarter of the lesser sum has been secured. To stop here would be disastrous to the Garden's prestige and the prestige of the Board. The City of New York is, I believe, capable of raising this institution of its own making to the premier place among botanical gardens and maintaining it there. It is the duty of the Board to keep this thought continually before those who can make it a reality. A pressing need now is $1,000,000 for the extension of scientific research, of which $400,000 would build, equip, and maintain a new laboratory, and the income of $600,000 would provide salaries for the desired additional members of the scientific staff.

The question is sometimes asked: "Why should the New York Botanical Garden engage in research?" It may not be amiss here to discuss this topic briefly. It is elemental to say that the present is the age of science, the age when men have ceased to be content with what has been and demand greater knowledge of the ways of nature, new points of view and new aids to living. Scientific research is already revolutionizing human life. Two of the most striking examples of this are to be found in medicine and industry. But nowhere is research more urgently demanded than within the field of plant life, which is daily and intimately related to human life and human welfare. In the face of this demand an institution devoted specifically to plant life could hardly be expected to remain static, a historical museum, content to bring together plants from all quarters of the globe, and to show only what nature has already done with them. In these modern, progressive days a botanical garden should be itself modern and progressive, should wring from nature more intimate secrets, should show how plants may be made to yield still greater aid to human living than they have yet yielded. This desirability of research was clearly recognized by the founders of the Garden at

its beginning more than thirty years ago, when its purposes, as stated in its Act of Incorporation, included "the advancement of botanical science and knowledge, and the prosecution of original researches therein and in kindred subjects." In accordance with this purpose one of the most notable features of its activity through all the past years has been that of investigation.

The New York Botanical Garden possesses certain distinct advantages as a center for scientific work: It is situated in a city which is already recognized as one of the world's important scientific centers; its close association with Columbia University brings it into touch with the University's research activities in the basal sciences, such as physics, biology, and geology, and in the school of medicine—a touch that is bound to be both inspirational and helpful in the selection of technical methods of research; it possesses four hundred acres of unusually varied topography, which afford unusually varied opportunities for the cultivation of living plants; it has abundant space for laboratories and experimental plots; it contains large collections of varied living plants, in greenhouses and out of doors—an arboretum that is rarely surpassed in the number and variety of its trees, a large collection of shrubs, and large and constantly increasing plantations of herbaceous plants, especially those of horticultural interest—all of which are available as material for research; it has an extensive library of botanical literature; its scientific directors are recognized men of science, permeated by the spirit of research and with a broad vision into its future; its staff is free from the distracting labor of routine teaching; the Garden is wholly free from political control; it affords every opportunity for the pursuit of long-continued investigations, such as many of the problems of experimental botany demand; its funds, already considerable, are increasing.

In the light of these considerations it would seem more pertinent to inquire, not "Why should the Garden engage

in research?'' but rather ''Along what lines should its research be pursued?''—as was pointed out by the president in his ''Statement . . . for the Information of the Board of Managers'' in April, 1923. In the past thirty years the science of plants has made remarkable advances, especially by the aid of the experimental, as distinguished from the older and more purely observational, method, and it is to the pursuit of these new aspects of the science that we must give especial attention in the future. In view of this the members of the Board are urged to reacquaint themselves with the discussion of the topic as presented in ''A Report on Scientific Research, by the Scientific Directors, 1925.''

Besides the above increase in endowment, one other contribution to the Garden's resources deserves special mention, namely, the pledge by the Carnegie Corporation of $6,000 annually for a period of five years in aid of public, especially adult, education. Adult education is now being emphasized as never before as a function of philanthropic institutions that deal with masses of the people, as is evidenced, for example, by the extension courses of universities and the efforts of museums to interest and instruct their visitors. In a recently published and illuminating article on ''Education for Adults,'' Frederick P. Keppel, President of the Carnegie Corporation, says: ''Education for adults has now become one of our major industries. . . . It is . . . well worth while to turn our attention to adult education . . . as an agency of very definite importance in making life better worth living for the American citizen.'' In the Act of Incorporation of the Garden, enacted in 1891, we find ''instruction of the people'' among the institution's purposes; and through all the intervening years this has been steadily pursued—by means of public lectures, the museum, publications, the supplying of a wide variety of information personally and by correspondence, and an organized system of docentry in which

a competent guide personally conducts individuals or groups of individuals through the collections and describes their characteristic features. The gift of the Carnegie Corporation will enable us to systematize and make more effective these existing educational measures and organize new measures, and thus develop more adequately than ever before this feature of the Garden's activities. The first step in this advance should be the appointment of a competent and experienced supervisor of public education.

While the above additions to the funds of the Garden afford facilities for improvement mainly in the future, the Board can look back with gratification upon other accomplishments which relate more especially to the year just closed. There has been better maintenance of the grounds and plantations. The outdoor horticultural displays have increased in variety, beauty, and usefulness to both professional and amateur gardeners. The transformation of the Lake Valley into a Rhododendron Glade of superior beauty, in conformity with the advice of Olmsted Brothers, has been begun through an extensive and necessary earth-fill. Another step forward in realizing the Olmsted plan has been taken in placing before the city's Board of Estimate and Apportionment our desires regarding the removal from the Garden's limits of the Park Department's greenhouses and workshops and the transfer of the land now occupied by them to the jurisdiction of the Garden Board, with the ultimate object of utilizing the site for a Landscape Garden. The Advisory Council has given much thought to the esthetic improvement of the grounds and plantations. The members of the Garden staff have shown their traditional whole-hearted loyalty to the interests of the institution. Exploration in the United States, Porto Rico, Bermuda, and northern South America has been carried on, and valuable additions to the collections have been made. The taxonomic

study of these and previous collections has been vigorously pursued by various members of the staff. Dr. Stout, Director of Laboratories, has continued his remarkably fruitful experimental investigations on the general topic of sterility and fertility. Public interest in and acquaintance with the Garden have been much increased, largely owing to the generosity of the public press throughout the whole country in circulating information regarding it.

In my report for 1925, I spoke of the competition for designs for small gardens that had been arranged through "The H. H. Memorial," a fund of $5,000 given by an anonymous donor. This competition, which was widely announced, attracted much attention, and one hundred and sixty plans from all parts of the country were submitted. In considering these the jury was impressed by their high quality and believed that the contest had done much to stimulate interest in small gardens. The first prize of $100 was awarded to Mr. Archie S. Hill, Wauwatosa, Wisconsin; the second prize of $75 to Mrs. William Harris Cary, Brooklyn, New York, and the third prize of $25 to Mr. L. L. Blundell, Brookline, Massachusetts. The three winning designs were published in the "Journal of the New York Botanical Garden," April, 1926. In the spring of 1926 a garden following the design that won the first prize was laid out and planted in the Botanical Garden. It has since been maintained and, like its predecessor of the year before, which too was given by the donor of "The H. H. Memorial," has attracted much favorable attention from visitors. A similar competition under "The H. H. Memorial" has been announced for 1927. By thus making visible artistically designed inexpensive gardens, the Botanical Garden is performing a most valuable service to the people and justifying one of its most important purposes.

It is noteworthy that there is occurring in this country at the present time a great growth of public interest in

plants and plant science. This is reflected in the existence of innumerable private gardens, large and small, in garden clubs, in horticultural societies, in flower exhibitions, and in the publication of books and periodicals devoted to gardens and gardening. But eagerness to know about plants and how they behave or can be made to behave is not limited to horticulture. It is evident in the extension of existing, and the founding of new, institutions devoted to the exhibition and especially the scientific investigation of plants. For example: Plans are in the making for a considerable enlargement of the Federal Botanical Garden in the city of Washington. The two classic institutions, the Arnold Arboretum and the Botanical Garden of Harvard University, are calling upon the public for increased funds to enable them to progress. The very active Missouri Botanical Garden, now thirty-eight years of age, has outgrown its quarters in St. Louis, and has recently acquired and begun to develop a tract of sixteen hundred acres of land outside the city, which will vastly increase its opportunities for the growth and study of plant life. A project is gradually taking shape for the organization of a Pacific Botanical Garden in the state of California, to utilize one thousand acres of land for plant research. The newly founded Boyce Thompson Institute for Plant Research, situated in Yonkers, New York, and devoted to fundamental research on plant problems, is one of the latest, best-equipped, and most promising of the research institutions in the field of plant science. The great need of forest research is being stressed on all sides; several organizations have recently engaged in a survey of this topic, and there is every prospect that these efforts will soon result in liberal financial aid to an extensive investigation of the problems of the growth and welfare of trees and their uses for mankind. The universities are widening the character of their researches on botanical topics, a notable example being the recent es-

tablishment in Cornell University of a research professorship in forest soils, which will deal with the chemistry and biology of soils, and other pregnant and timely problems. Promising opportunities for the investigation of tropical and semi-tropical plant life have recently been offered by the establishment through American agencies of biological stations in the Panama Canal Zone, Cuba, and Bermuda. In the light of this widespread and growing interest in the things of the plant world it behooves us as administrators of the New York Botanical Garden to make every effort to place our institution in a position of national leadership.

FREDERIC S. LEE,
President

REPORT OF THE SECRETARY AND DIRECTOR-IN-CHIEF FOR THE YEAR 1926

Through an increased city appropriation for maintenance, and larger expenditures of corporate funds than in previous years, somewhat more critical care has been taken of grounds, plantations, buildings, and collections, principally through the employment of additional laborers, keepers, and assistants, and some progress has been made in construction and development. Much larger outlay is, however, necessary, in order to realize the possibilities of the institution, recreational, educational, and scientific. Some of these opportunities for usefulness may be taken up during the coming year, through other increases in allowances by the city, and from the income on the additional endowment funds, generously contributed by many friends through the operations of the Campaign Committee, under the chairmanship of President Lee.

Police protection has been more comprehensive and this, together with our additional keepers, the erection of more railings along paths, and enclosing areas characterized by valuable natural features, and the construction of several hundred feet of boundary fence has tended to prevent depredations and deterioration, which the increasing number of persons using the grounds has made likely. Intentional depredations have been few; some have been checked, and individuals punished. But considerable further extension of these protective measures is still required. It is now desirable to build a simple fence to enclose completely the nurseries and experimental grounds on the eastern side of the reservation, to complete the boundary fence along the Southern Boulevard and Pelham Avenue, and to extend railings along the paths and trails in the southern part of the Hemlock Grove, and elsewhere.

As indicated in previous reports, completion of the path system is needed, both for the convenience of the

public and because an ample path system is an excellent protection for grounds and plantations, as the great majority of pedestrians follow the paths as a matter of course. Some path-building was accomplished during the year, especially at and near the new entrances on Pelham Avenue, where about 500 lineal feet were completely constructed and nearly as much more partly built. Much more remains to be done, especially in the southern parts of the reservation, through the Arboretum east of the Bronx River, and locally in other parts of the grounds.

All the plantations have been maintained with various substitutions, minor expansions, and some additions.

The Herbaceous Grounds and the Rock Garden have continued under the immediate care of Dr. Southwick, the Dahlia Collection in charge of Dr. Howe, and the Experimental Gardens in charge of Dr. Stout, but all the other plantations and collections of plants, their labeling and recording, including the Arboretum, Fruticetum, Horticultural Grounds, Flower Gardens, Border Screens, Model Gardens, Nurseries, Water Gardens, Rose Garden, Lilac Garden, Public Greenhouses, and Propagating Houses have continued under the oversight of Mr. Boynton, Head Gardener, assisted by Foreman Gardeners Finley and Becker. The scope of Mr. Boynton's responsibilities is altogether too extensive; he has, at present, to know about the location, cultivation, botany, and other attributes of over 15,000 different kinds of plants and has far more questions to answer, verbally or by letters, about them than any other member of the staff; his knowledge is wonderful, but this condition demands relief.

Floral displays have been continued on about the same scale as in recent years, with considerable extension of the Narcissus plantations through the continued contributions of Mrs. Wheeler H. Peckham; over 58,000 new tulip bulbs were given by the Holland Bulb Growers' Association; replacements and additions have been made in the

rose collection through the continued interest of Messrs. Bobbink and Atkins, and in the iris collections through the American Iris Society and the investigation of the native species of the southeastern United States by Dr. John K. Small.

Additions, replacements, and modifications in arrangement have been made in the Arboretum, Fruticetum, Flower Gardens, Herbaceous Gardens, Rock Garden, and Greenhouse Collections. The total number of species and varieties in the grounds and greenhouses during the year has been about 16,970.

We have been fortunate up to the present time, in freedom from plant diseases and destructive insect pests. Such as have been detected have mostly been controlled by ordinary methods, but it is time that precautions be taken. The Scientific Directors have given this subject much consideration, not alone from the standpoint of protection of the collections, but also from the vast field of investigation offered by these collections in the domain of plant pathology. Addition of a phytopathologist to the staff would be the first step in this direction.

The necessity of partly filling with earth the old lake valley in the southeastern part of the reservation suggested as an available area for extensive plantations of rhododendrons and related plants was mentioned in my last annual report, such filling having been made necessary by the blockage of an old culvert. Large quantities of earth were obtained without charge by Superintendent Corbett during the early part of the year, from contractors who were excavating for cellars in the vicinity, and dumped by them into the two ends of the flooded valley. Work in distributing this material was commenced during the summer and is still in progress; altogether it will require moving over 25,000 cubic yards. Park Commissioner Hennessy obtained permission to make the required sewer-connection for the drainage of this valley

and has made application to the Board of Estimate and Apportionment for an appropriation of $4,000. The final surface contour and grades of the valley can be exactly determined only after this drainage-sewer is built; our present work is filling what we know to be a minimum amount.

The proposed removal of the Park Department barn, shops, and greenhouses, standing on three parcels of land within and enclosed by the Garden reservation, mentioned in my last annual report, has received much further consideration. At the request of Park Commissioner Hennessy, Mr. Brinley was commissioned to coöperate with him and his engineers, Farrelly and Seymour, in selecting a new site for these buildings; this study was made during the summer; a site was agreed upon, and a plan for the grouping of the structures drawn, and approved by the Commissioner, who has asked for an appropriation of $200,000 from the Board of Estimate and Apportionment.

It will be recalled that the valley near the Bronx River, on which the Park Department greenhouses now stand, was suggested as a site for a large landscape garden in the report by Olmsted Brothers. The removal of these greenhouses would free this valley for this very desirable purpose, if, as we have also requested, this land be added to the Garden reservation; such development would permit of extensive plantations laid out without regard to scientific or economic educational features. The area of the Lorillard Mansion site, to the north, would also be available for such plantations.

The application made at our request by Commissioner Hennessy, to the Board of Estimate and Apportionment in 1925, for an appropriation sufficient to build a driveway connection between the Rose Garden and the Iris Garden, including a bridge over the Bronx River, has not yet been acted upon; this driveway, located as indicated

in the report of the Olmsted Brothers, would lie across the southern end of the proposed landscape garden and would complete the road-system of the reservation. Much grading and planting will be necessary along this new road after it is built.

From the foregoing paragraphs it will be seen that we have three major enterprises for development in coöperation with the city, and for which city appropriations have been asked:

1. The valley for the Rhododendron Glade.
2. The valley for the Landscape Garden.
3. The new driveway and bridge.

During the spring, the site formerly occupied by the Lorillard Mansion was graded, regulated, and sown; an area of about an acre is thus made available for planting; much grading with topsoil was also required along the borders of the driveways rebuilt by the Department of Parks in 1925.

Grading and filling of lands of Fordham University adjoining the Garden reservation, during the year, have made necessary the reconstruction of part of a boundary fence and several hundred feet of path, with considerable grading and replanting; this work should be accomplished during the coming season.

Repairs and replacements included the reglazing of the upper dome of House 1 and the roof of House 11, Conservatory Range No. 1, and rebuilding the brickwork supporting all the five boilers in Power House 1, by means of contracts awarded through the Department of Parks; minor repairs to buildings, furniture, water-pipes, steam-pipes, and drains were made by our own mechanics and laborers under the direction of Mr. Corbett. During the coming year large expenditure for painting will be necessary.

The need of constructing soon a wing of the Museum Building becomes more and more apparent as the devel-

opment of the Garden proceeds. The plan for the completed edifice contemplates two wings running out northeastward from the present structure and a connecting feature in the rear, leaving a court; provision was thus made in the plan for more than doubling the capacity of the part built in 1898–1900. The accumulation of specimens and books during 25 years has almost filled all the available floor-space with cases and tables. Laboratory working space has been reduced to an insignificant area and office space is restricted. More room for herbarium cases will soon be required. While the herbarium has become large, it does not yet compare in size with some of the Old World herbaria; when Dr. Hill, Director of the Kew Garden, was here in the autumn, he told us that the herbarium of his institution contained over 4,000,000 specimens; ours is not more than one-half as large.

Electric lighting of the Museum Building, for which an appropriation of $10,000 was made by the Board of Estimate and Apportionment in the spring, may soon be obtained through a contract to be awarded by the Department of Parks. The Edison Company has brought a cable to the building for this service, from the Mosholu Parkway Entrance.

Lectures of a semi-popular character on botanical, horticultural, and allied subjects were given in the Museum Building by members of the staff and invited speakers on 39 Saturday afternoons from March 1 to November 30. The total attendance was 3,658, an average of about 94 to a lecture, a slight increase over the record of the preceding year. There were also lectures and demonstrations on Saturday afternoons during the winter months in the Central Display House of Conservatory Range No. 2.

Docentry work with classes from public and private schools and with daily visitors was continued, chiefly by Mr. R. S. Williams, Administrative Assistant, and Mr. Percy Wilson, Associate Curator. All members of the

staff have continued to respond to many letters asking for scientific information or for practical assistance in the cultivation of plants.

The Garden library now contains approximately 35,513 bound volumes. Accessioning of the important collection of books from Geneva, purchased in 1923, is now complete, with the exception of a large number of pamphlets. In January, the residue of the botanical library of Dr. John Hendley Barnhart, comprising about 2,000 volumes and many pamphlets, was purchased, and these volumes are now being accessioned. During the past few years, seven new steel stacks have been installed in the Morphological Laboratory to accommodate the expansion of the library, and the shifting of the books to utilize completely these new stacks was begun near the end of 1926. This will involve moving nearly all the books of the library.

Botanical exploration and collecting were accomplished in Porto Rico during the late winter, where I was occupied with Mrs. Britton and Dr. Arthur Hollick for about two months, especially in further studies of cultivated plants and in obtaining a large and important series of fossil plants from the Collazo Shales of the Oligocene Period; the notes on cultivated plants were brought together in Part 3 of Volume VI, Scientific Survey of Porto Rico and the Virgin Islands, and published in June; noteworthy description and illustration of the fossil plants has been nearly completed by Dr. Hollick for publication in Part 3 of Volume VII of the same work. During a longer period early in the year, Dr. Gleason was occupied, with Dr. Mel T. Cook, in studies of the Plant Ecology of Porto Rico; their report of this investigation is now in press as Parts 1 and 2 of this Survey.

Dr. John K. Small, under the continued generous patronage of Mr. Charles Deering, made two extensive trips in the Southeastern States, one in the spring, the other in the latter part of the year. Many thousand duplicate her-

barium specimens collected by him in former years have been determined, labeled, and arranged for exchanges with other institutions at home and abroad; from these we are promised invaluable collections from many parts of the world.

Dr. P. A. Rydberg spent about two months of the autumn in field work in Minnesota, the Dakotas, Kansas, and Nebraska, for continuation of his studies on the vegetation of the Great Plains; his descriptive flora of this region has now been made essentially complete for publication.

Dr. Fred J. Seaver visited Bermuda for about a month early in the year, in company with Professor H. H. Whetzel, of Cornell University, for further investigation of the fungi; they detected many species hitherto unknown to exist there; this collection is now being studied.

In continuation of our investigation of the flora of Northern South America, in coöperation with the Smithsonian Institution and the Gray Herbarium of Harvard University, Mr. Ellsworth P. Killip, of the United States National Museum, proceeded, in August, to Cartagena, Colombia, accompanied by Mr. Albert E. Smith, a former student at the Garden; they intend to collect specimens in several parts of northern Colombia over a period of about six months.

Investigational work of considerable scope has been accomplished chiefly in connection with curatorial duties by members of the staff and by students under their direction. My own studies of the West Indian flora were continued, as were those of Dr. Howe in phycology, and those of Dr. Small on the vegetation of the southern United States; Dr. Rydberg gave some time to the study of the flora of the Great Plains of North America; Dr. Gleason gave much attention to the large collections from northern South America obtained in recent years; Dr. Seaver continued mycological investigations, and Mr. Wilson,

studies of the Cuban flora; Dr. Stout accomplished much in the fields of genetics and floral sterility.

The serial publications of the Garden during 1926 included twelve numbers of the monthly *Journal,* six numbers of *Mycologia,* four parts of *Addisonia,* one part of *North American Flora,* one number of the *Bulletin,* and nine numbers of *Contributions.* The need of additional assistance in editorial work, emphasized in my last report, continues to be urgent.

A special subscription fund was contributed to meet part of the expenses of the purchase of plants, botanical exploration, book binding, museum labels, fencing, path construction, and grading. This was given by forty members as follows:

Mr. Vincent Astor	$ 200.00
Mr. John W. Auchincloss	25.00
Mr. George Blumenthal	50.00
Dr. N. L. Britton	1,000.00
Mrs. Frederick A. Constable	100.00
Mr. James W. Cromwell	200.00
Mrs. Charles D. Dickey	50.00
Mr. Marshall Field	100.00
Mr. Murry Guggenheim	200.00
Mr. J. Montgomery Hare	25.00
Mr. Anton G. Hodenpyl	100.00
Mr. Adrian Iselin	100.00
Mrs. Delancey Kane	50.00
Mrs. Gustav E. Kissel	50.00
Mr. Adolph Lewisohn	50.00
Mr. Kenneth K. Mackenzie	250.00
Mr. William J. Matheson	100.00
Mr. Ogden Mills	250.00
Hon. Ogden L. Mills	100.00
Mr. Barrington Moore	50.00
Dr. L. R. Morris	250.00
Dr. Robert T. Morris	25.00
Mr. E. E. Olcott	25.00

Mr. Charles Lathrop Pack	100.00
Mrs. George W. Perkins	100.00
Mr. W. H. Perkins	100.00
Mr. H. Hobart Porter	100.00
Mrs. William Kelly Prentice	50.00
Mr. Mortimer L. Schiff	250.00
Miss Ellen J. Stone	50.00
Mr. Frederick Strauss	50.00
Mr. F. K. Sturgis	250.00
Mrs. John T. Terry	100.00
The Daniel and Florence Guggenheim Foundation	200.00
Mr. Louis C. Tiffany	100.00
Mrs. Harold McL. Turner	50.00
Mr. Felix M. Warburg	100.00
Mr. Allen Wardwell	50.00
Mrs. William H. Woodin	100.00
Miss Julia Wray	100.00
Total	$5,200.00

The city appropriation for maintenance of grounds, buildings, and collections has been increased from $225,000 for 1926 to $230,000 for 1927.

Reports by members of the staff are appended.

N. L. Britton,
Secretary and Director-in-Chief

REPORT OF THE HEAD CURATOR OF THE MUSEUMS AND HERBARIUM

The several collections under my supervision were developed as in former years, the additions being derived through the several channels and in quantities, recorded in the *Journal* during the year, and here indicated as follows:

By gift and purchase	2,813
By exchange	6,376
By exploration	4,666

Thus a total of 13,855 specimens was accumulated for the public exhibits and for the study collections. The collections and exhibits were maintained and improved on the same lines as in former years. The accessions came from all parts of the world—a minimum from the Old World. These latter elements bear more or less indirectly on the active work of the Garden. Among the regions in which the active work of the Garden is in progress and from which the great bulk of the specimens were derived may be mentioned Canada, continental United States, Mexico, Panama, Colombia, British Guiana, Brazil, Peru, Ecuador, Chile, and the West Indies, especially Bermuda, Cuba, Hispaniola, Porto Rico and the Virgin Islands, and Trinidad.

About 6,300 specimens were sent to other institutions in exchange for other specimens needed for immediate or for future use in connection with the investigational work of members of the Garden Staff.

MUSEUMS

The collections of the Economic Museum, the Systematic Museum, and the Local Flora, and the Fossil-plant Museum were augmented by the interpolation of specimens. The microscope exhibit and the plant-picture ex-

hibit were maintained as in the preceding year. No new equipment was added.

Several hundred specimens were interpolated in the several divisions of the Economic Museum.

HERBARIA

The general herbarium, the Local Flora herbarium, and the Columbia University herbarium were increased by the addition of desirable specimens selected from the various collections referred to above.

The one large addition to the herbarium resources was the moss herbarium of the late Dr. George N. Best (not included in above total of accessions).

About 16,000 herbarium sheets were added to the collection. These represent the total of about 20,000 specimens selected from collections received during the current year or in former years.

INVESTIGATIONS AND ASSISTANCE

Dr. P. A. Rydberg, Curator, continued in charge of the collection of flowering plants. Besides the routine work of sorting and selecting specimens for mounting, distributing the mounted material into the herbarium cases, identifying plants sent in for determination, answering inquiries and giving information relative to his department, selecting exchange material for other institutions, etc., he accomplished some research work, mainly in connection with his work on *Astragalus* and related genera, and on the flora of the prairie and plain region between the Mississippi River and the Rocky Mountains. Regarding the former, the work is advanced so far that the manuscript will be completed during the coming year, and will constitute two parts of North American Flora. In the early summer a week was devoted to study at the Academy of Natural Sciences, Philadelphia. During September and October, he visited the herbaria of institutions in the Central West for studies in connection with

his work on the flora of that region. Limited field work was accomplished in Minnesota, but the plan to visit the Turtle Mountains in North Dakota was frustrated by an unusually early snow storm. Dr. Rydberg was a delegate, both to the International Botanical Congress, held at Ithaca, New York, where he gave a paper entitled "Scylla or Charybdis," in which he illustrated the extreme tendencies in taxonomic botany, and also to the meetings of the American Association for the Advancement of Science and the Botanical Society of America held at Philadelphia, where he acted as Chairman of the Systematic Section. The following publications have issued from his hand during the year: "Notes on Fabaceae—VII—*Geoprumnon* and *Hesperastragalus*"; "Two new species from the mountains of West Virginia"; "Some Extinct or Lost and Rediscovered Plants—III—*Psoralea stipulata.*" Manuscript prepared by him for a part of North American Flora went to the printers and reached the stage of galley proof by the end of the year. It covers the tribes Liabeae, Neuroleneae, and a part of Senecioneae, mainly the genus *Arnica,* of the Carduaceae.

Dr. H. A. Gleason, Curator, sailed for Porto Rico January 14 and returned to New York May 5. During his absence he collaborated with Dr. Mel T. Cook, Government Botanist and Plant Pathologist of Porto Rico, in an ecological survey of the island, as a contribution to the scientific survey of Porto Rico and the Virgin Islands. A brief report of his activities has already been submitted (Journal 27: 104–106. 1926), and the results of his researches are now in press, constituting Parts 1 and 2 of Volume VII of the Scientific Survey of Porto Rico and the Virgin Islands. The elaboration of his field work and the preparation of manuscript occupied his time for a further period of four months. During the remainder of the year he has handled the herbarium material from South America and continued his studies on the flora of

the northern part of that continent, with special reference to British Guiana. He has also delivered two public lectures as a part of the regular Garden series. His publications for the year are as follows: "The individualistic concept of the plant association"; "Botanical features of Ceylon"; "The Guianas" (with William Beebe); "Ecological studies in Porto Rico"; "Studies on the flora of northern South America—IX"; "Miscellaneous new species from British Guiana," and "In British Guiana jungles."

Dr. Fred J. Seaver, Curator, continued his care of the fungous collection and prosecuted further studies on the fungi during the year. On January 9, he sailed in company with Professor H. H. Whetzel for several weeks' further investigation on the fungous flora of the Bermudas. A comparatively large collection was obtained and preliminary studies of many of the species made in the laboratory of the Public Gardens. This collection will be divided between Cornell University and the Garden, and studied as opportunity is afforded. "The mycology of Porto Rico and the Virgin Islands" (Scientific Survey of Porto Rico and the Virgin Islands, Volume 8, Part 1), was completed and printed during the year. This work comprises 208 pages, including the host index. Dr. Seaver also continued to edit *Mycologia* and gave the usual number of lectures. Also a number of minor papers were published by him.

Mr. Percy Wilson, Associate Curator, continued his studies on West Indian plants. Since the completion of the seventh part of the Flora of Porto Rico and the Virgin Islands, which finished the treatment of the flowering plants, in coöperation with Dr. Britton, he gave special attention to revising the manuscript of a Flora of Cuba, made necessary by recent exploration and the acquisition of critical specimens. He also determined specimens and collections of specimens from the West Indies for other

institutions. Besides his work as docent on week-day afternoons, Mr. Wilson had special charge of a large number of classes from both public and private schools for outdoor, conservatory, and museum instruction. Mr. Wilson labeled and sorted the many thousand duplicate herbarium specimens collected by the undersigned in Florida during the past decade, thus preparing them for distribution to other institutions as exchanges.

Mrs. William Mitchell, Associate Curator, was associated with Dr. Rydberg in the care of the collection of flowering plants, having a large part in the sorting and distribution of dried and fluid specimens, and with Mr. Wilson in preparing duplicate specimens for distribution. Early in the year she gave the herbarium of cultivated plants a complete renovation and later in the year renovated several families of the general herbarium. Mrs. Mitchell cared for the development of the local herbarium. Aside from sorting and distribution of some miscellaneous material, she sorted and arranged the monocots of the Bicknell herbarium (exclusive of the grasses) so that they are readily accessible. The genus *Carex* was arranged and put in the hands of a carex expert for study. A large set of aquatic plants was accumulated for Dr. Hugo Glück, of Heidelberg, in exchange for other aquatics.

Dr. H. H. Rusby, Honorary Curator of the Economic Collections, had supervision of the collections of the Economic Museum. (For details see his report.)

Dr. Arthur Hollick, Paleobotanist, had supervision of the fossil plant collection. (For details see his report.)

Mrs. N. L. Britton, Honorary Curator of Mosses, had supervision of the moss collections. (For details see her report.)

Dr. H. M. Denslow, Honorary Custodian of the Local Herbarium, had supervision of the collection of local plants. (For details see his report.)

The undersigned, in addition to curatorial routine, continued his intensive studies in the flora and floristics of the southeastern United States east of New Mexico, giving tangible form to some of them in manuscripts of manuals, parts of which are now in press. In this connection he nearly finished assembling the specimens collected in the southeastern states during many trips of exploration, making one set available for preservation in the herbarium and the residue for exchange. In part, in this connection, two trips of exploration—spring and fall—with the coöperation of Charles Deering, were made into the Gulf States, from Florida to Louisiana. Numerous minor plant problems were solved in the field, a great deal of herbarium and museum material was secured, numerous live herbaceous and woody plants were sent to the Garden for growing as future subjects for illustrating in *Addisonia.* Much additional material of this character—seeds and plants—were secured through correspondence, especially through Robert Runyon, from the Rio Grande Valley. From all this live material many paintings were made by Mary E. Eaton, for future illustration in *Addisonia.* This field-work contributed much to his further studies in certain critical plant groups, *i.e.*, flags (*Iris*), spider-lilies (*Hymenocallis*), enabled the making of many plant photographs, and, in connection with former field-work led to the preparation of numerous manuscripts of various caliber, about a dozen of which were published during the year.

JOHN K. SMALL,
Head Curator of the Museums and Herbarium

REPORT OF THE HEAD GARDENER

HORTICULTURAL OPERATIONS

The gardening staff, under the direction of Messrs. John Finley and H. W. Becker, Foreman Gardeners, consisted of 27 gardeners and 14 laborers. The outside force, under direction of Mr. Finley, after finishing the winter tree work, spent the major part of the season in flower-garden work. Chrysanthemum, Phlox, and Rose collections and the borders were cared for. The 1926 prize Garden was begun. Mrs. Wheeler H. Peckham supervised the planting of beds in the Iris Garden. The tulip display beds were prepared and planted with 58,850 bulbs, the Conservatory Court beds with 34,800 of Early Singles, Cottages, and Doubles, the remaining 24,050 Darwins and Breeders having been planted in the Horticultural Grounds. 25 trees were planted along roads and paths, 10 trees were planted in the Pinetum, 36 trees were planted in the Arboretum, 120 Shrubs were planted in the Fruticetum. There were 10 specimens planted in the dwarf collection, and among the late-blooming shrubs 20 species and varieties. The laying out of the flower collections was under the direction of Mr. John Hartling, Head Gardener's Assistant.

GREENHOUSE OPERATIONS

The greenhouse force, under the direction of Mr. Becker, has maintained the indoor collection as usual. The plants in House No. 1, Range No. 1, consisting of palms, were removed and replaced, pending the glazing of the upper dome. Those in House No. 11 were removed while the reglazing was being done. 1,119 plants, including 325 Chrysanthemums, 90 Primulas, 125 Begonias, 96 Gloxinias, 50 Impatiens, 20 Peppers, were grown for exhibition in the Central Display House. The feature exhibition was the Chrysanthemum show, the 50 new varie-

ties given by Elmer D. Smith & Co., Adrian, Michigan, being especially fine. An increasing number of seedlings were raised for the systematic collections, the Rock Garden, the Flower Gardens, and the Nurseries, as well as plants for Dr. Small's studies of native irises, for Dr. Stout's researches, and several thousand bedding plants.

SYSTEMATIC PLANTATIONS

Herbaceous Grounds. There have been 380 species of plants added to the herbaceous collection this year, through seeds, gifts, and collections, these distributed over about 75 families. With these additions this collection now contains about 1,630 species; these added to those of the Rock Garden, Flower Gardens, and Nurseries, give the Garden a collection of nearly 3,500 species of herbaceous plants.

Woody Collection. 75 species of hardy woody plants new to our collections were raised from seed this year, increasing the plants in the nursery available for these collections by about 250.

Conservatories. About 26,478 plants are now in our greenhouse collections, including 9,512 in Range No. 1, 9,635 in Range No. 2, and 7,331 in the Propagating Houses. 82 varieties of water-lilies, 350 plants, were shown in the Conservatory Court.

MISCELLANEOUS COLLECTIONS

Rose Garden. 250 hybrid tea and hybrid perpetual, polyantha, and climbing roses for replacements, also new varieties, were added to the Garden this year by Bobbink & Atkins, of Rutherford, New Jersey.

Dahlia Garden. 420 varieties, represented by 992 plants, were grown in the Dahlia Border, under the direction of Dr. M. A. Howe.

Iris Garden. The Iris collection contains now about 1,057 varieties, 3,419 plants, including the alphabetical

and the nursery collections. 1,286 plants of American native Irises, collected by Dr. Small and others, were added to this collection.

Narcissus Collection. This collection contains 61,200 plants and 146 varieties in massed and naturalistic planting, same as last year, except for the natural increase.

Hyacinth Display. This display remains the same as last year.

Gladiolus Collection. The Gladiolus collection now contains about 5,000 bulbs in about 40 varieties.

Variegated Plant Collection. 68 varieties, 500 plants, were displayed in the variegated plant bed.

Hardy Chrysanthemum Collection. 95 varieties, 1,095 plants, were grown for this display. An increasing interest in this collection was shown by people all over the country.

Peony Collection. This collection now contains 166 varieties, 427 plants.

Phlox Collection. This collection contains 30 varieties, 330 plants, of which 130 plants in 12 varieties were given by Bobbink & Atkins, Rutherford, New Jersey.

Lilac Garden. The Lilac collection consists of 560 plants of 186 named varieties.

Canna Collection. 1,710 plants, 76 varieties, were displayed in this collection. 16 new varieties were purchased and 1 new variety was given.

Tulip Display. 58,850, in 117 varieties, were given by the Dutch Bulb Exporters' Association.

Coleus Collection. This collection consisted of about 3,500 plants in 10 varieties and was planted along the terrace east of Range No. 1.

Mallow Collection. This collection remains the same as last year.

Rock Garden. 546 species of plants were set out in the Rock Garden in 1926, under the direction of Dr. E. B. Southwick. Mrs. W. H. Peckham presented many bulbs

of Narcissus, Crocus, Colchicum and other genera. These, together with mass planting of Sedums, Sempervivums, and quantities of plants raised by Dr. Southwick from cuttings, made the Rock Garden a great attraction to visitors.

Dwarf Collection. This collection contains 62 plants in 27 varieties.

LABELING, RECORDING, AND HERBARIUM

Under the direction of Mr. John Hartling, Head Gardener's Assistant, with one label boy part of the year, a total of 3,128 labels have been made and placed, including 253 for the Fruticetum, 22 for the Arboretum, 30 for the Pinetum, 360 for the Horticultural Grounds, 607 for Conservatory Range No. 1, 213 for Conservatory Beds, 161 for Herbaceous Grounds, 282 for Iris Garden, 326 for the Dahlia Border, 221 for the Rose Garden, 145 for the Economic Garden, 166 for the Lilac Garden, 89 for the Waterlilies, 57 for the Tulip Display, 166 for the Morphological Garden, and 32 for Roads and Paths; 2,500 pot labels were cleaned and painted, 178 signs painted. Accession numbers 56244 to 57909 have been recorded, making a total of 1,664 accessions for the year. 3,528 packets of seed were received; 1,500 of these have been collected by members of this department on the grounds; 22 were received by gift, 1,312 by exchange, 2,028 by purchase, 12 by collection. 59,522 bulbs were received and 8,122 plants; of the latter, 620 were by gift, 2,237 by collection, 1,495 by exchange, 2,192 by purchase, and 1,578 from seed. 200 specimens were added to the herbarium of cultivated plants. This department has collected material for schools, nature study, and college classes in botany and exchanged living plants with institutions and parks.

LECTURES

I have delivered four lectures in the regular courses.

KENNETH R. BOYNTON,
Head Gardener

REPORT OF THE DIRECTOR OF LABORATORIES FOR THE YEAR 1926

GENERAL MATTERS

Such routine duties as the keeping of meteorological records, the arranging of programs for the conferences of the scientific staff, the general care of the laboratories, and the giving of lectures in the Garden courses have been performed during the year.

The position of technical assistant, made vacant September 1st by the resignation of Miss Hester M. Rusk, was filled for the year following that date by the appointment of Mr. T. Susa.

I served as secretary of the International Conference on Flower and Fruit Sterility, which was held in New York City during August, under the auspices of the Horticultural Society of New York. The organization of the program of this Conference and the editing of the proceedings which are to be printed as a Memoir of the Society have required considerable time. A full report of this Conference will appear elsewhere.

Certain matters of laboratory equipment and management now require attention. A constant-temperature oven is necessary for adequate studies of pollen germination, chambers for maintaining low temperatures for studies of the longevity of pollen are greatly needed, and new paraffin ovens are desired. All these are vital for the most successful prosecution of various studies of fertility and sterility. I respectfully request that this equipment be obtained in the very near future. The expansion of the library has somewhat curtailed laboratory space and facilities and brings the matter of adequate laboratory arrangement to the front for consideration.

PERSONAL RESEARCH

My main research continues to be directed to sterility and fertility in plants and to problems in plant breeding. These may be reported as follows:

Investigation with species of Lilium. This project, which has been in progress for a number of years, has three main aims: (1) the study of sterilities, (2) the study of the cultural requirements, and (3) the improvement by breeding and hybridization. Special attention has been given this year to the growing of seedlings. Several hybrids have flowered, among which is one from the cross *L. regale*× *L. Sargentiae.* Several hundred bulbs reared from seed have been furnished this year for display plantings. From bulbs supplied by Mrs. Mortimer J. Fox and Mr. C. P. Horsford, plants were forced for an educational exhibit at the International Flower Show. A case of bulbs, comprising several kinds needed for experimental work, was purchased this autumn from funds kindly supplied by Mrs. Wheeler H. Peckham.

Studies with day lilies (*Hemerocallis*). We now have assembled nearly all of the species and most of the available varieties of day lilies for studies of sterility and for breeding. We are now growing about 2,000 seedling day lilies. Most of these are hybrids of the second generation from crosses with *fulva* as one of the parents. These plants exhibit a wide range of variations in shape, size, and color of flowers and in habit of growth. Many are worthy of propagation for general culture in flower gardens. Selections of the best plants are being propagated through exchange relations with the Wyomissing Nursery Company for distributing to the trade. A cytological study of the various species of *Hemerocallis* and their hybrids is well under way and for the *H. fulva* this study is nearly complete.

Sterility in Irises. The American Iris Society provided for a scholarship this year for further study of sterility in irises. This was granted to Mr. Clarence E. Moore, and the report of his studies has already been published in the *Bulletin* of the American Iris Society. Mr. Robert Greene also made some excellent studies of the sterilities

of the early dwarf bearded irises, as a student investigation.

Investigations at the New York Agricultural Experiment Station. I am continuing to coöperate with the Horticultural Department of the New York Agricultural Experiment Station in studies of the pollination requirements of fruit trees and in the project of breeding for new varieties of hardy seedless grapes. I am pleased to report that a new seedless grape has been obtained whose fruits closely resemble those of the Thompson Seedless variety. This plant bore fruit this year for the first time. It was secured in a delibrate effort to produce seedless grapes by breeding hardy near-seedless plants with seedless varieties. Efforts will now be made to secure more seedlings of this sort, of which it is hoped some suitable for culture in this section of the United States will be obtained.

The breeding of poplars. Noteworthy progress has been made in the project of breeding poplars, which is being conducted in coöperation with the Research Department of the Oxford Paper Company. Mr. E. J. Schreiner has continued in this work with the assistance of several persons in the employ of the Oxford Paper Company. Seedlings have been obtained from 96 different cross-combinations between species and varieties and breeding within several of the species is also in progress. A total of over 13,000 seedlings are being grown. During the first summer of their growth these seedlings are cared for at our Propagating Houses. Then they are grown in a field nursery at Strathglass Farm, near White Plains, the property of Mr. Hugh Chisholm, President of the Oxford Paper Company. The seedlings are being carefully studied and selections will be made of the most promising ones for propagation as clonal strains to be planted for pulp-wood timber.

Other investigations. In various cultures of *Pelargonium,* studies of sterility are being combined with studies of the heredity of variegation and doubleness of flowers.

The requirements for cross-pollination have been studied in the Feijoa and fruit obtained on our greenhouse plants. Studies of self- and cross-incompatibility are being continued in species of *Linaria,* species of *Antirrhinum,* and in Chinese cabbage. Fruit in abundance has been obtained by cross-pollination between different clonal strains of the Lily of the Valley, all of which appear to be self-incompatible. Breeding of the pale-pink Lily of the Valley is being carried on in the hope that the color may be intensified. An investigation of the sterility of the "cigar plant" (*Cuphea ignea*) is in progress. Various phases of these studies are being handled as projects for the research of registered students.

During the year a final report has been prepared on the flower behavior of avocados based on the observations made in California and in Florida. This is published in volume 7 of the Memoirs of The New York Botanical Garden.

REGISTERED STUDENTS AND SCHOLARS

During the year, the following persons have been enrolled at the Garden, either as recipients of scholarships or as students registered for credits in Columbia University:

Ballard, Charles Wm., Histology and taxonomy of *Erythroxylon.*

Bowers, Clement G., The breeding of Rhododendrons and Azaleas.

Goodlatte, Amelia R., Cytology.

Greene, Robert A., Plant breeding.

Jacot, Arthur P., Taxonomy. Plants of northern China.

Krauss, Gertrude H., Plant breeding.

Schreiner, Ernst J., Plant breeding, pathology, and taxonomy of the genus *Populus.*

Smith, Albert C., Taxonomy of ferns.
Susa, Torasaburo, Sterilities in plants.
Toro, Rafael A., Mycology.
Wodehouse, Roger P., Morphology of pollen.

A. B. STOUT,
Director of the Laboratories

REPORT OF THE BIBLIOGRAPHER

Assistance to visitors using the library, and bibliographic and editorial work, have filled my time throughout the year.

Volume 7, part 11, of *North American Flora,* appeared in August. Another part of the same volume is partly in type; a part of volume 34 is nearly ready for publication; and work on several other parts is in progress. The last number of volume 10, and three of volume 11, of *Addisonia,* have been published during the year. The third number of volume 11, due on the last day of September, did not appear until December 9; but the concluding number, thanks to the coöperation of the Director-in-Chief with the editors, was nearly ready to come out at the end of the same month, and is promised for the first week in January. It is five years since a number has appeared so near the nominal publication date.

Accessioning of the Geneva library purchase of 1923 was essentially completed by the Librarian during 1926, but listing of duplicates, which devolves upon the Bibliographer, is not yet finished. The portion of my own library that has been reserved for the purpose for several years, comprising about two thousand volumes and many pamphlets, was purchased by the Garden in January, and has been partially accessioned.

JOHN HENDLEY BARNHART,
Bibliographer

REPORT OF THE LIBRARIAN

Owing to various causes the census of the library was again omitted, but the following statistics with regard to the bound volumes are furnished by the records. There were received by gift 54, including 15 presented by Mr. N. T. Kidder in 1917 and not hitherto accessioned, by exchange 31, and by purchase 677. The last number includes 258 volumes remaining from the Geneva collection, 266 from the library of Dr. J. H. Barnhart purchased in January, and 153 others. There have been bound during the year 776 volumes, including 30 belonging to Columbia University. The total number of bound accessions for 1926 is, therefore, 1,538, which, added to the number in the library at the beginning of the year, 33,975, makes the present number to be 35,513.

There have also been accessioned 245 unbound volumes and pamphlets from the Barnhart library, 223 from the Geneva purchase, and a large number of others acquired chiefly by gift or exchange. The cataloguing of the Geneva collection is now complete with the exception of a large number of pamphlets still unexamined. It is possible that these may include some rarities.

The leading accessions have been listed in the *Journal* as heretofore.

There have been added to the catalogue 1,983 typewritten and 5,223 printed cards, the latter issued by the Torrey Botanical Club. Three boxes of new species cards sent out by the Gray Herbarium have also been filed. The drawers containing this collection are again becoming somewhat crowded and it seems advisable that a new case be secured in the near future.

The large influx of volumes due to the Geneva and Barnhart purchases, as well as the constantly increasing numbers of bound periodicals, have caused an overcrowded condition in certain portions of the library. Late in November the moving of the books was commenced,

the works on landscape architecture, horticulture, and agriculture, in part, being transferred to the new stacks in the laboratory. Further progress will be made as rapidly as possible and it is hoped that by spring the work may be nearly, if not entirely, completed.

A number of new *Bulletin* and *Mycologia* exchanges have been made, in some instances the *Journal* also having been sent.

A complete list of the serials received has not been published since 1922. It is desirable that such a list should be printed at frequent intervals, but the large amount of cataloguing, as well as the pressure of other duties have so occupied the librarian's time for the past few years that she has been unable to give this matter the time and careful attention which it demands.

The following additions and corrections should be made to the list of serials as appended to the report of the Librarian for 1921 (Bulletin **12**: 41–61) and supplemented in the report for 1922 (**12**: 139), 1923 (**12**: 211, 212), 1924 (**13**: 33), and 1925 (**13**: 126):

Omit the following:

Der Pilz und Kreuterfreund, Heilbronn a. N., Germany.
La Nuova Notarisia, Modena, Italy.
Mexico. Dirección general de Agricultúra, San Jacinto, Mex. *La Revista Agricola.*

Add the following:

American Microscopical Society, Urbana, Ill. *Transactions.*
Archivio Botanico, Forlì, Italy.
Better Homes and Gardens, Des Moines, Ia.
Kief. Botanic Garden, Kief, Russia. *Bulletin, Seed Lists.*
Krasnodar. Experimental Institute for Tobacco Culture, Krasnodar, Russia. *Bulletin.*
Moscow. Musée d'État de la Region Industrielle Centrale, Moscow, Russia. *Mémoires.*

Moscow. Société des Amis des Sciences Naturelles d'Anthropologie et d'Ethnographie, Moscow, Russia. *Mémoires.*

Mykologia, Prague, Czecoslovakia.

Omsk. Siberian Institute of Agriculture and Forestry, Omsk, Russia. *Report.*

Quarterly Review of Biology, Baltimore, Md.

Sendai. Tohoku Imperial University, Sendai, Japan. *Science Reports* (*Biology*).

Tartu. Botanical Institute and Garden, Tartu, Esthonia. *Acta.*

Tiflis. Polytechnic Institute, Tiflis, Russia. *Bulletin.*

Tijdschrift over Plantenziekten, Wageningen, Holland.

Tokyo. Imperial Academy, Tokyo, Japan. *Proceedings.*

Warsaw. École Supérieure d'Agriculture. Institut de Génétique, Warsaw, Poland. *Mémoires.*

SARAH H. HARLOW,
Librarian

REPORT OF THE SUPERINTENDENT OF BUILDINGS AND GROUNDS

REGULATING AND GRADING

The roads and paths of the Garden have been regulated and graded extensively during the past year.

The two sides of the main drive from the South Gate to the northern entrance and of the west drive from 200th Street to the large circle beyond the lakes were sown with lawn-grass seed. The path on the western side of the Bronx River, at the entrance near the Linnaeus Bridge on Pelham Parkway, was graded for a distance of 250 feet, and both sides of this path were regulated, guttered, and sodded for the same distance. In order that the entrance on Pelham Parkway might conform with the sidewalks there, 198 feet of 18-inch curbstone were used.

As in former years, contractors building in the vicinity of the Garden, who were looking for a convenient place to dispose of soil unearthed from excavations, have brought a considerable amount of soil into the Garden at their own expense. They carted in about 20,000 yards of this soil during the year, 19,000 yards of which were placed along the northern and eastern sides of the Long Lake, in order to fill in the bottom of the valley and 400 yards were used to complete the grading of the cellar of the Lorillard Mansion. For filling at the lilac collection 300 yards of this soil were used and the remaining 300 yards were placed in the picnic grounds on the western side of the Bronx River, so as to complete the culvert built there.

Since the latter part of July, six to ten laborers were assigned to the work of filling in the Long Lake, which is now about one-third filled.

DRAINAGE

Four catch-basins and 90 feet of 6-inch drain-pipe were used for drainage purposes at the Pelham Parkway en-

trance, near the Linnaeus Bridge, in addition to 40 feet of 12-inch pipe which had also been installed so as to carry this drainage into the Bronx River. In order to connect a catch-basin at the entrance to the picnic grounds with the 6-inch drain-pipe that carries the drainage into the river, 115 feet of 6-inch drain-pipe were utilized, and 50 feet of 8-inch pipe were used to convey the drainage from the main road to the lake north of the Museum Building. A 4-inch drain-pipe 75 feet long connected a lavatory installed at the Propagating Houses with the sewer on the Bronx Boulevard.

WATER SUPPLY

Necessary repairs were made to the water systems of the Museum Building, Conservatory Ranges 1 and 2, the Propagating Houses, the comfort stations, and to all the drinking fountains throughout the grounds.

PATHS

A path 240 feet long and 10 feet wide was built and completed at the Pelham Parkway entrance near the Linnaeus Bridge. A 10-foot path 180 feet long to the small gate was built and completed on the eastern side of the river, and on its western side, leading to the picnic grounds, a path 170 feet long and 10 feet wide was built with liner stones and made ready for Telford stoning. The paths of the Iris Garden, through the White Pine Collection, around the terrace of Conservatory Range 1, and the eastern and western paths near the Museum Building, as well as all the paths of the northern and eastern sections of the Garden, were cleaned and resurfaced. A path 300 feet long and 10 feet wide was made ready for Telford stones on the northern side of the Long Lake near the Rose Garden.

BUILDINGS

Necessary repairs were made to the window sashes and doors as well as to the steam and water systems of the

Museum Building. The east wing of the second floor of the Museum Building was partitioned and three small offices were laid out on the southern side. Twenty-eight herbarium cases were built and placed on the second floor of the east wing. Two coats of paint were given to the east and west exhibition rooms of the basement of the Museum Building.

At Conservatory Range 1 all the glass and sash bars of the upper dome of House 1 and the glass and sash bars of House 11 were replaced. House 11 also received two coats of paint and all its 3-inch copper leaders were replaced with new leaders. The broken glass at Conservatory Ranges 1 and 2 and at the Propagating Houses was also replaced by the painters.

The brick work from the floor level to the top of all five boilers at Power House 1 was rebuilt. The four 6-inch valves on the main steam lines from Power House 1 to the Museum Building and to Conservatory Range 1 were replaced and a 6-inch steam-pipe 15 feet 9 inches long, bent to a template, was used to make repairs in the trench of Conservatory Range 1.

The heating systems of the Museum Building, Conservatory Ranges 1 and 2, and of the Propagating Houses were repaired when necessary by our steam engineers. Three bowls and eight tanks were used in repairing the plumbing system of Comfort Station 2 and a lavatory and two bowls were installed at the Propagating Houses.

GROUNDS

A one-rail fence, 700 feet long, was erected along the path from the plaza near the New York Central station to the Moshclu Parkway entrance and another 370 feet long was put up north of the Mosholu Parkway Entrance. Along the path from the Elevated Railroad to the Museum Building 420 feet of a one-rail fence was built and a one-rail fence, 140 feet long, was placed along the main

road south of Conservatory Range 1. A two-rail fence, 1,260 feet long, was erected along the path on the western side of the picnic grounds and another two-rail fence, 210 feet long, was built near the Linnaeus Bridge entrance. All of this makes a total of 1,630 feet of one-rail fencing and 1,470 feet of two-rail fencing which has been erected during the year.

A boundary fence 6 feet high and 109 feet long, with two gate posts 29 x 29 inches wide and 9 feet 6 inches high, and two pier posts 20 x20 inches wide and 8 feet high were constructed on Pelham Parkway east of the Bronx River near the Linnaeus Bridge. The Pelham Parkway entrance on the western side of the Bronx River was completed; to accomplish this, two large posts 46 x 46 inches x 12 feet 2 inches and two posts 35 x 35 inches x 9 feet 2 inches were used as gate posts for the roadway and paths. Two posts 35 x 35 inches x 9 feet 2 inches and three posts 20 x 20 inches x 8 feet, with 200 feet of iron fencing 6 feet high, were built at this entrance on a foundation 2 feet x 3 feet topped by a cast-stone wall, with coping stone 2 feet high and 96 feet long. Along the Southern Boulevard 450 feet of a foundation wall 2 x 3 feet, with a rubble-stone wall 12 inches high, and eighteen pier posts 20 x 20 x 12 inches in dimensions were erected.

Repairs were made to the cedar and one- and two-rail fencing throughout the grounds and the maps and signs were replaced or repaired wherever necessary. The rustic benches also received needed repairing.

Wood cut from dead or fallen trees supplied the Propagating Houses with fuel for nearly four months and approximately fifty-five tons of hay were used during the year. The uprooting of the poison ivy vines in the Garden has also been continued.

About a dozen picnics a week visited the Garden from May until September, averaging from 75 to 1,500 children a party. These children, who attend the public and Sun-

day schools of Greater New York, New Jersey, and Connecticut were escorted to the picnic grounds of the Garden by our special guards, who are assigned there daily during the summer months.

Four uniformed police officers were again assigned to us each day from ten in the morning until six in the evening from May until December. They were assisted by two additional officers in civilian clothes. In order to assist our own keepers in the patrol of the Garden on Sundays and holidays, ten guards were selected from the laborers and gardeners. About 325 summonses were served by the police officers for violations of park ordinances, the offenders being fined from one to twenty dollars in the magistrates' courts.

The visitors to the Garden on Saturdays, Sundays, and holidays during the summer months numbered about 55,000, but during July and August this number was greatly augmented.

For twenty-four hours a day special guards were assigned to the rose, gladiolus, and dahlia collections, and because of the watchfulness of our employees very little damage was done to the plantations in general throughout the grounds.

ARTHUR J. CORBETT,
Superintendent of Buildings and Grounds

REPORT OF THE HONORARY CURATOR OF THE ECONOMIC COLLECTIONS FOR THE YEAR 1926

The important event of this year's history of the Economic Museum has been the appropriation of money for the completion of our label-printing, and for the reprinting of such labels as require correction. As I have pointed out in previous reports, hundreds of our specimens, now in the cases, are without other identification records than their serial numbers or slips of paper giving collection and other data. Quite a number of others, which possess labels, are better known now than at the time of their installation, and require more complete labels. Most of the manuscript for this work is already written and the printing has been commenced.

In the preparation of new labels, a slight modification of plan has been introduced, which avoids much useless repetition, and also saves some space in the cases. When several specimens of the same article are displayed, only one complete descriptive label is prepared, the specimens being grouped around it, each being supplied with a label that states its individual character.

Another important work that has been practically completed during the past year is the determination of the economic products obtained by the Mulford Expedition in 1921–22. Most of the edible fruits of that collection have proved to represent new species of plants, the descriptions of which have been written and are expected to be published before the printing of this report. This collection of wild edible fruits was exhibited at the Fourth International Botanical Congress, held in Ithaca, in September last, where it attracted much attention. In connection with the publication of these species, about three hundred others, with several genera, have been published.

Some interesting additions of edible fruits, mostly in the family Annonaceae, have been contributed from Florida, as a result of the discoveries of Dr. Small.

A set of dressed specimens of Brazilian woods has been donated by myself, but these are awaiting botanical determination before being installed.

About twenty-five other specimens, from various sources, have been added during the year.

H. H. Rusby,

Honorary Curator of the Economic Collections

REPORT OF THE PALEOBOTANIST

The principal item of investigation was concerned with the Tertiary flora of the Collazo shales of Porto Rico. An extensive collection of specimens was made during the period of my sojourn on the island last March, and a preliminary report upon the results attained was submitted, and was published in the May issue of the Journal of the Garden. Subsequently all of the specimens were subjected to critical examination and all that were deemed worthy of description were drawn, in preparation for illustration. The work of identifying and describing the specimens, in connection with the drawings, has occupied most of my time during the latter part of the year, and is nearing completion.

I also examined and reported upon a collection of fossil walnuts and lignite from a deposit of Post-Tertiary age in the north coast region of Porto Rico, which was made the subject of an illustrated article published in the October issue of the Journal of the Garden.

Two days were spent in the field work, one with Professor M. A. Chrysler, of Rutgers University, examining fossil plant remains in the Cretaceous clays of Woodbridge, New Jersey, and one with Dr. H. A. Gleason, examining the flora of the serpentine area on and in the vicinity of Todt Hill, Staten Island.

During the period August 14–22, I was in attendance at the session of the International Congress of Plant Sciences, held at Ithaca, New York, and December 27–31, I attended the Philadelphia meeting of the Botanical Society of America and contributed a paper in connection with a symposium on "The geographic background of taxonomy."

It was my privilege to deliver two lectures in the regular Garden courses, viz., "A historical review of the study of fossil plants," and "Fossil plants of New York City and vicinity," and an Arbor Day address, at the White

Plains High School, on "The Sequoias and redwoods of California."

About 200 specimens were added to the paleobotanical collections, which are included under lots numbered 37–45 in the record book. All but twenty-five of these specimens represent those that were collected in Porto Rico.

Accessions of paleobotanical literature include twenty-three octavo and eleven quarto separates, all but five of which were received as exchanges from twenty-one different authors, six of whom represent new contributors.

ARTHUR HOLLICK,
Paleobotanist

REPORT OF THE HONORARY CURATOR OF MOSSES

The notable event during the year has been the gift from the estate of the late Dr. George N. Best of his large collection of mosses with a legacy of $3,000 and the collection of roses which he made when he was studying this genus. The herbarium is being mounted and distributed and the duplicates will be used in exchange. During the year we have continued to receive sets of Exsiccatae, Dr. Grout's North American Musci Pleurocarpi, nos. 489–500; Prof. Holzinger's fascicles 23 and 24, nos. 551–600, and an interesting set of mosses from Arizona and New Mexico distributed by Mr. Edwin B. Bartram, who is making his home in Tucson during the winter and devoting himself to local studies and to the mosses of Mexico and Central America. He has kindly undertaken to study the collections made in Costa Rica by Dr. Paul Standley, and we have supplied him with specimens for comparison and descriptions of species. We have also received from the Carnegie Museum some mosses from Tahiti, and, from Brother Victorin, some from the vicinity of Quebec, Canada. Our own collections from Porto Rico have been named and incorporated in the Herbarium. Dr. George E. Nichols, of Yale University, keeps on sending us duplicates of his collections from Northern Michigan and Brother León continues to explore certain portions of Cuba.

Mr. Williams has served as President of the Sullivant Moss Society during the year, having been reëlected, and has determined several collections of mosses from Alabama, Louisiana, and Florida, also from Utah, Washington, and other states. He has also studied some large collections of mosses from Chili and Peru, received from the Field Museum at Chicago. We have also continued our exchanges with M. Thériot on South American mosses.

The lantern-slide collection has been cared for by Miss Lillian Bostock, and all records and accessions and loans

made under my supervision. 120 slides and 70 negatives have been added. Mrs. Edward C. Bodman, Chairman of the Rock Garden Committee of the Advisory Council of The New York Botanical Garden, very kindly donated $50.00 to be applied to lantern slides of Rock Garden plants, and a number of rare and interesting colored slides have been added to our collection.

I have continued to reply to all letters asking for information relative to the protection and cultivation of native American wild flowers, particularly the Fringed Gentian and the American Holly. Owing to the publicity given by the press to letters relating to their conservation, this has entailed a good deal of letter writing. Dr. Stout collected seed of the Fringed Gentian at Pleasantville and Dr. Norton and various correspondents were supplied with small packets. From studies made of the roots, however, it would appear that a species of mycorhiza of unknown character is necessary for the successful cultivation of *Gentiana crinita.* In order to demonstrate this, Dr. Stout has brought down a quantity of the soil where the Fringed Gentian was found and planted the seeds. Heretofore all pot-grown plants have been stunted and failed to make any quantity of flowers or seed.

Potted plants of the American Holly, *Ilex opaca,* have been sent to the International Flower Show, to local and county fairs and other exhibitions, where they have attracted a great deal of attention. Mr. A. E. Hitchcock, of the Boyce Thompson Institute, has been supplied with seeds and cuttings from our trees in the Fruticetum, also with cuttings from an English Holly belonging to Dr. George Webster, of Decatur Avenue, the Bronx. Owing to the slow germination of Holly seeds, experiments are in progress to accelerate the growth from seeds and cuttings. A number of growers in Virginia and Delaware and Florida are growing Holly commercially and it is

hoped soon to be able to supply the increasing demand of those who want to grow their own Holly and put a stop to the destruction of this most beautiful native plant.

ELIZABETH G. BRITTON,
Honorary Curator

REPORT OF THE HONORARY CUSTODIAN OF THE LOCAL HERBARIUM

The work done in the Local Herbarium during the year, chiefly by Mrs. William Mitchell, has been largely as follows:

Sorting and distributing of some accumulations of mounted material.

Sorting of the monocotyledons of the Bicknell Herbarium (exclusive of Gramineae), by genus, species, and date into sets for future use, as well as writing labels for each sheet, beginning with Typhaceae. Records have been kept of the determination, exact locality, and date of each species of Mr. Bicknell's own collecting. The genus *Carex* is especially well represented by 2,733 sheets and is now arranged so as to facilitate the final determination by a *Carex* expert.

A set of aquatic plants, consisting of 182 specimens from the Bicknell Herbarium, was made up and sent to Dr. Hugo Glück, Heidelberg, in exchange for European plants.

Accessions for 1926 amount to 112. Twenty-nine specimens have been pressed, mounted, and distributed.

An additional case will be needed in the Local Herbarium before a set of the local Bicknell specimens can be incorporated with the present Herbarium, as there is practically no room at present for expansion.

H. M. DENSLOW,
Honorary Custodian of the Local Herbarium

REPORT OF THE CHAIRMAN OF THE BOARD OF SCIENTIFIC DIRECTORS

The Board of Scientific Directors have held their regular meetings through the year, and have discussed many problems relating to the present and future work of the Garden.

In the death of Dr. James Furman Kemp we have lost one of our most valued members. Dr. Kemp was a charter member of the Garden, and for many years secretary of its Board of Scientific Directors.

The significant achievements of the year in the maintenance and further development of the Garden's already very extensive collections of plants, in its educational activities, and in its special research work and publications, are presented in the report of the Director-in-Chief.

From the standpoint of the material now available at the Garden for experimental work in plant breeding, it is interesting to note that the special collections of Dahlias, Roses, Lilies, and Iris have been maintained at a high standard of excellence during the past year. The careful identification and checking up of both new and old types in all these groups is going on satisfactorily, and the value of the collections as material for further genetical work is thus being continually enhanced. The experimental work in growing many species of Lilies from seed promises to clear up certain difficult problems as to methods of propagation in this long-studied genus.

The dual purpose of such collections, and the advantages which accrue from their location in a great metropolitan garden, where they serve both as attractive decorative displays and at the same time furnish material for intensive genetic analysis, has been often noted in these reports but can hardly be overemphasized.

These collections of selected highly decorative types also afford the best of opportunities for the early detection of, and research upon, the diseases and parasitic

pests of ornamental plants. During the current year study has been begun upon what appears to be a virus disease of dahlias. For several years past this disease has been doing considerable damage and attracting much attention from dahlia growers.

The Garden, as a part of the park system of New York, is confronted with many very pressing questions as to the varieties of trees and shrubs best adapted for decorative planting under city conditions. The further problems as to the minimum and optimum soil and atmospheric requirements for such varieties are much in need of more exact determination. The location and general topography of the Garden makes it especially well suited for such experimental work. With the additional funds which have been secured during the year, through its administrative officers and the campaign committee of the Board of Managers, the Garden may well look forward with renewed confidence in the hope of obtaining still further support, and to an increase of its research activities in many lines of plant science.

R. A. HARPER,
Chairman, Board of Scientific Directors

TREASURER'S REPORT FOR THE YEAR ENDING DECEMBER 31, 1926

John L. Merrill, Treasurer

EXHIBIT I

BALANCE SHEET

December 31, 1926

Permanent Fund Assets:			
Investments (Exhibit III)		$1,763,823.29	
Cash awaiting investment		60,858.47	
			$1,824,681.76
Permanent fund assets expended for current uses (see current fund liability per contra)			49,546.68
			$1,874,228.44
Current and Working Assets:			
Cash in banks and on hand:			
General purposes	$ 20,906.30		
Special purposes	9,305.63		
		$ 30,211.93	
Accounts receivable—City maintenance		15,584.58	
Interest and dividends receivable (Exhibit III)		26,763.52	
Prepaid insurance premiums		541.51	
			$ 73,101.54
			$1,947,329.98

EXHIBIT I

BALANCE SHEET

December 31, 1926

Permanent Funds (Exhibit IV):			
Restricted endowments		$ 154,367.47	
Unrestricted endowments, including unconditional bequests set aside by the Board of Managers as permanent funds		1,702,860.97	
Special endowment, with life interest in respect of income therefrom		17,000.00	
			$1,874,228.44
Current Liabilities and Special Funds:			
Current liabilities:			
Accounts payable		$ 4,282.56	
Special funds (Exhibit V):			
Unexpended income from restricted funds	$ 3,232.13		
Unexpended income from contributions set aside by the Board of Managers for specific purposes	6,073.50		
		9,305.63	
Deferred income credits:			
Membership dues paid in advance	$ 445.00		
Subscriptions paid in advance	220.00		
		665.00	
Indebtedness to permanent funds for expenditures of fund assets for current uses		49,546.68	
Surplus:			
Excess of income over expenditures for the year ending December 31, 1926 (Exhibit II)	$13,082.98		
Less—Deficiency at December 31, 1925	3,781.31	9,301.67	
			73,101.54
			$1,947,329.98

CERTIFICATE OF AUDITORS

We have examined the books and accounts of The New York Botanical Garden for the year ending December 31, 1926, and certify that the attached balance sheet (Exhibit I) and relative statements (Exhibits II to V, inclusive) are correctly prepared therefrom, and, in our opinion, set forth fairly the financial position of the corporation as at December 31, 1926, and the transactions for the year ended on that date.

APRIL 11, 1927

PRICE, WATERHOUSE & Co.

EXHIBIT II

Statement of Operations for the Year Ending December 31, 1926

	City maintenance	General	Restricted and special funds	Total
Income:				
Income from investments of permanent funds		$ 85,337.19	$ 7,558.84	$ 92,896.03
Contributions	$225,000.00	12,683.99	7,500.00	245,183.99
Membership dues:				
Annual		14,310.00		14,310.00
Sustaining		475.00		475.00
Sales of plants, duplicate books, etc.		689.25		689.25
Subscriptions and sales of publications		3,153.67	1,871.95	5,025.62
Total income	$225,000.00	$116,649.10	$ 16,930.79	$358,579.89
Expenses:				
Maintenance and general expenses:				
Salaries of Director-in-chief, assistants and Garden staff	$156,107.42	$ 36,953.48		$193,060.90
Wages	24,210.00	12,456.55		36,666.55
Materials and supplies	44,682.58	2,586.62		47,269.20
Stationery, printing, postage, etc.		3,438.13		3,438.13
Interest and exchange		232.55		232.55
Insurance		1,550.58		1,550.58
Miscellaneous		3,616.78		3,616.78
Expenses in connection with increase of endowment and development plan		4,149.30		4,149.30
	$225,000.00	$ 64,983.99		$289,983.99
Improvements and exhibits:				
Improvements to buildings and grounds		$ 19,645.32	$ 4,980.00	$ 24,625.32
Museum equipment purchased		3,980.58		3,980.58
Library equipment purchased		950.00		950.00
Laboratory equipment purchased		293.22		293.22
Library books, bindings, etc.		4,753.33	2,546.66	7,299.99
Museum specimens		125.73	140.02	265.75
Plant purchases and expenses		902.66	433.58	1,336.24
Botanical exploration and collections		532.76	1,100.00	1,632.76
Model Garden prizes			200.00	200.00
		$ 31,183.60	$ 9,400.26	$ 40,583.86
Education and research:				
Public lectures and instruction		1,460.99	446.50	1,907.49
Scholarships, prizes, etc.		200.00		200.00
Publications		5,271.62	4,401.15	9,672.77
Research		465.92	401.73	867.65
Investigation and preservation of native plants			46.99	46.99
		7,398.53	$ 5,296.37	$ 12,694.90
Total expenses	$225,000.00	$103,566.12	$ 14,696.63	$343,262.75
Excess of income over expenses for the year		$ 13,082.98	$ 2,234.16	$ 15,317.14

EXHIBIT III

Summary of Investments December 31, 1926

	Par value	Approximate market value	Book value	Accrued interest and dividends Dec. 31, 1926	Average yield for year on basis of book value
General funds:					
Bonds	$ 565,000.00	$ 551,264.64	$ 550,490.11	$ 7,596.45	4.85%
Stocks:					
Preferred	15,000.00	17,025.00	16,302.50	237.50	5.83
	$ 580,000.00	$ 568,289.64	$ 566,792.61	$ 7,833.95	4.88%
Sage Fund:					
Bonds	$ 570,000.00	$ 553,348.14	$ 510,458.81	$ 10,028.74	5.41%
Stocks:					
Preferred	70,000.00	79,793.75	67,121.87	762.50	6.26
Common	72,200.00	141,536.00	93,762.50	1,805.00	7.78
	$ 712,200.00	$ 774,677.89	$ 671,343.18	$ 12,596.24	5.90%
Endowment and Development Fund:					
Bonds	$ 220,000.00	$ 224,131.25	$ 220,158.75	$ 2,708.33	5.00%
Stocks:					
Preferred	242,500.00	292,803.12	288,528.75	3,625.00	5.54
	$ 462,500.00	$ 516,934.37	$ 508,687.50	$ 6,333.33	5.30%
Special Trust Fund:					
170 shs. All America Cables, Inc., stock	17,000.00	24,650.00	17,000.00	.....	7.00%
	$1,771,700.00	$1,884,551.90	$1,763,823.29	$ 26,763.52	5.41%

EXHIBIT IV

Statement of Permanent Funds, Showing Changes during the Year Ending December 31, 1926

	Balance at Jan. 1, 1926	Additions	Deductions	Balance at Dec. 31, 1926
Restricted endowments:				
Endowment for science and education	$ 89,115.49			$ 89,115.49
Addison Brown Fund	21,149.31			21,149.31
John Innes Kane Fund	10,347.63			10,347.63
Maria DeWitt Jesup Fund	25,000.00			25,000.00
Olivia E. and Caroline Phelps Stokes Fund	3,000.00			3,000.00
Charles Budd Robinson Fund	755.04			755.04
The H. H. Memorial Fund	5,000.00			5,000.00
	$ 154,367.47			$ 154,367.47
Unrestricted endowments:				
Endowment Fund	$ 228,013.54	$ 500.00		$ 228,513.54
David Lydig Fund	34,337.86			34,337.86
Students' Research Fund	4,776.00	410.00		5,186.00
William R. Sands Fund	10,000.00			10,000.00
Darius Ogden Mills Fund	48,099.17			48,099.17
Henry Iden Fund	10,000.00			10,000.00
Fanny Bridgham Fund	30,000.00			30,000.00
Francis Lynde Stetson Fund	25,000.00			25,000.00
Russell Sage and Margaret Olivia Sage Memorial Fund	709,539.37	14,293.02		723,832.39
Frances Griscom Parsons Fund	2,304.67			2,304.67
Endowment and Development Fund	292,101.00	274,349.50	$499.50	565,951.00
The Charles Patrick Daly and Maria Lydig Daly Fund	19,636.34			19,636.34
	$1,413,807.95	$289,552.52	$499.50	$1,702.860.97
Special endowments:				
Special Trust Fund	$ 17,000.00			$ 17,000.00
	$1,585,175.42	$289,552.52	$499.50	$1,874,228.44

EXHIBIT V

SPECIAL FUNDS

Statement of Application of Income from Restricted Permanent Funds and Special Contributed Funds Designated for Specific Purposes

	Balance at Jan. 1, 1926	Additions	Expenditures	Balance at Dec. 31, 1926
Restricted Permanent Funds:				
Endowment for science and education:				
Public lectures and instruction, research, and publications other than "Addisonia"	$ 447.51	$ 4,363.68	$ 3,942.15	$ 869.04
Addison Brown Fund:				
Publication of "Addisonia"	499.83	2,907.56	3,407.39	.....
John Innes Kane Fund:				
Plant purchases and expenses	445.47	506.69	433.58	518.58
Maria De Witt Jesup Fund:				
Botanical collections	321.35	1,224.16	140.02	1,405.49
Olivia E. and Caroline Phelps Stokes Fund:				
Investigation and preservation of native plants	201.57	146.90	46.99	301.48
Charles Budd Robinson Fund:				
Exploration	65.03	36.97	100.00	2.00
The H. H. Memorial Fund:				
Development of model gardens	90.71	244.83	200.00	135.54
	$2,071.47	$ 9,430.79	$ 8,270.13	$3,232.13
Special Funds contributed for specific purposes:				
Helen C. Inslee bequest designated by the Board of Managers for construction of Linnaean Bridge Entrance	$5,000.00		$ 4,980.00	$ 20.00
Contribution of Dr. N. L. Britton for botanical exploration		$ 1,000.00	1,000.00	.....
Contributions for Garden Club lectures and lantern slides		500.00	446.50	53.50
Contribution of Trustees of Carnegie Corpn. for program of public education		6,000.00		6,000.00
	$5,000.00	$ 7,500.00	$ 6,426.50	$6,073.50
	$7,071.47	$16,930.79	$14,696.63	$9,305.63

REPORT OF THE COMMITTEE ON PATRONS, FELLOWS, AND MEMBERS FOR THE YEAR 1926

The number of new members who have qualified is 131. The number of annual members is now 1,527; life members 125; sustaining members 21.

Of the annual members 69 are now in arrears for dues for 1926, 26 for dues for 1925 and 1926, 19 for dues for 1924, 1925, and 1926.

Dues have been collected to the amount of $14,960.

Two persons have qualified as life members by the payment of $250 each. These sums have been transmitted to the treasurer.

A complete list of all classes of members to date is herewith submitted:

BENEFACTORS

Edward D. Adams,
*Mrs. Fanny Bridgham,
*Hon. Addison Brown,
*Andrew Carnegie,
Columbia University,
*Hon. Charles P. Daly,
Daniel Guggenheim,
Murry Guggenheim,
Edward S. Harkness,
*D. O. Mills,
*J. Pierpont Morgan, Sr.,
John D. Rockefeller,
John D. Rockefeller, Jr.,
*Mrs. Russell Sage,
*Francis Lynde Stetson,
*Cornelius Vanderbilt.

PATRONS

Oakes Ames,
*Miss Catherine A. Bliss,
Dr. N. L. Britton,
*Hon. Addison Brown,
*Andrew Carnegie,
*Mrs. George Whitfield Collord,
*Mrs. Louisa Combe,
*James M. Constable,
Charles Deering,
*William E. Dodge,
James B. Ford,
*William B. Ford,
*George J. Gould,
Edward S. Harkness,
*Mrs. Esther Herrman,
Frederick Trevor Hill,
Archer M. Huntington,
*Henry Iden,
*Mrs. Helen C. Inslee,
Mrs. John Innes Kane,

* Deceased

*John Stewart Kennedy,
*Mrs. Mary J. Kingsland,
Prof. Frederic S. Lee,
Mrs. Frederic S. Lee,
*J. Pierpont Morgan, Sr.,
*Oswald Ottendorfer,
*Lowell M. Palmer,
*William Rockefeller,
*William R. Sands,
*William C. Schermerhorn,
*James A. Scrymser,
Mrs. Finley J. Shepard,
*Samuel Sloan,
*Mrs. Frederick F. Thompson,
*W. K. Vanderbilt,
Mrs. Antoinette Eno Wood.

Fellows for Life

Edward D. Adams,
George F. Baker,
Miss Elizabeth Billings,
Dr. N. L. Britton,
Mrs. N. L. Britton,
Mrs. Andrew Carnegie,
Mrs. W. Bayard Cutting,
Dr. Robert W. de Forest,
James B. Ford,
Daniel Guggenheim,
Murry Guggenheim,
S. R. Guggenheim,
Mrs. William L. Harkness,
Mrs. John Stewart Kennedy,
Prof. Frederic S. Lee,
Mrs. Frederic S. Lee,
Ogden Mills,
J. P. Morgan,
Mrs. Lewis R. Morris,
E. A. Richard,
Mrs. John A. Roebling,
Mortimer L. Schiff,
Leon Schinasi,
Miss Olivia E. Phelps Stokes,
Charles G. Thompson,
Louis C. Tiffany,
Tiffany & Company.

Life Members

Edward D. Adams,
Dr. Felix Adler,
Dr. S. T. Armstrong,
Edward W. C. Arnold,
Mrs. Hugh D. Auchincloss,
Dr. John Hendley Barnhart,
George A. Barron,
Aurel Batonyi,
Gustav Baumann,
Samuel R. Betts,
William G. Bibb,
Miss Elizabeth Billings,
Mrs. Robert Woods Bliss,
George Blumenthal,
G. T. Bonner,
Mrs. Addison Brown,
J. Hull Browning,
Mrs. Andrew Carnegie,
T. Morris Carnegie,
Miss Marian Roby Case,
Frank R. Chambers,
Hugh J. Chisholm,
Hugh J. Chisholm, Jr.,
George C. Clark,

* Deceased

Banyer Clarkson,
Dr. James B. Clemens,
William F. Cochran,
W. R. Coe,
William Colgate,
Miss Georgette T. A. Collier,
W. E. Conner,
Mrs. F. A. Constable,
S. Wilbur Corman,
R. N. Cranford,
Melville C. Day,
Charles Deering,
Mrs. John Ross Delafield,
Maturin L. Delafield,
W. B. Dickerman,
Miss Josephine W. Drexel,
Miss Ethel DuBois,
William A. DuBois,
George E. Dunscombe,
Thomas Dwyer,
George Ehret,
Ambrose K. Ely,
Dr. John F. Erdmann,
Edward J. Farrell,
Marshall Field,
Mrs. H. J. Fisher,
Andrew Fletcher,
Charles R. Flint,
Eugene G. Foster,
Mrs. John French,
Childs Frick,
Daniel Guggenheim,
Bernard G. Gunther,
Franklin L. Gunther,
Charles J. Harrah,
Dr. Louis Haupt,
R. Somers Hayes,
John Hubbard,
Archer M. Huntington,
Frank D. Hurtt,
James H. Hyde,
Mrs. Columbus O'D. Iselin,
Dr. Walter B. James,
Miss Annie B. Jennings,
Mrs. David J. Kelley,
Nathaniel T. Kidder,
H. R. Kunhardt,
W. B. Kunhardt,
Charles Lanier,
W. V. Lawrence,
Mrs. George Lewis,
Joseph Loth,
William H. Macy, Jr.,
Louis Marshall,
Edgar L. Marston,
William J. Matheson,
C. W. McAlpin,
A. G. Mills,
Mrs. William F. Milton,
Dr. Lewis R. Morris,
Newbold Morris,
Sigmund Neustadt,
A. Lanfear Norrie,
Gordon Norrie,
George M. Olcott,
Mrs. Charles Tyler Olmstead,
William Church Osborn,
W. H. Perkins,
Curt C. Pfeiffer,
Gustavus A. Pfeiffer,
M. Taylor Pyne,
Miss Florence E. Quinlan,
John J. Riker,
J. C. Rodgers,
Thomas F. Ryan,
Mrs. Herbert L. Satterlee,
Dr. Reginald H. Sayre,
Edward C. Schaefer,

Mortimer L. Schiff,
Mrs. I. Blair Scribner,
George Sherman,
James Shewan,
Miss Marion Smith,
James Speyer,
Miss Ellen J. Stone,
Albert Tag,
Paul G. Thebaud,
Charles G. Thompson,
Robert M. Thompson,
William Thorne,
Oswald W. Uhl,
Miss Anna Murray Vail,
F. T. Van Beuren,
Mrs. C. Vanderbilt,
F. M. Warburg,
John I. Waterbury,
S. D. Webb,
Dr. W. Seward Webb,
John D. Wing,
Mrs. Anna Woerishoffer.

Sustaining Members

Miss Elizabeth Billings,
Miss Mary T. Bryce,
Mrs. F. J. Godsol,
John Greenough,
Mrs. E. V. C. Hawkes,
O. H. Kahn,
Mrs. Frida Merz Krollpfeiffer,
Edgar L. Marston,
George Grant Mason,
Arthur M. Mitchell,
William Church Osborn,
William H. Porter,
Mrs. Mabel Prell,
Edward Prizer,
Mrs. James T. Pyle,
Mrs. Stanley Resor,
J. E. Spingarn,
Dr. Edward H. Squibb,
William R. Stewart,
Charles Strauss,
Arthur Hays Sulzberger.

Annual Members

Dr. Robert Abbe,
Benjamin Abert,
John Achelis,
C. E. Adams,
Mrs. Elbridge L. Adams,
F. B. Adams,
Henry S. Adams,
Maurice D. Adams,
Mrs. George B. Agnew,
Carl J. R. Ahrnke,
J. E. Aldred,
Mrs. Winthrop W. Aldrich,
Mrs. W. H. Aldridge,
Sir Douglas Alexander, Bart.
Mrs. John W. Alexander,
Mrs. Frederick Allen,
James F. Allen,
Philip Allen,
Dr. C. Ludwig Ambos,
Mrs. O. P. Amend,
Lindsay C. Amos,
Mrs. Alexander L. Anderson,
P. Chauncey Anderson,
J. M. Andreini,
Miss Charlotte L. Andrews,
W. Edson Andrews,

D. A. Ansbacher,
Mrs. John F. Archbold,
Francis J. Arend,
Reuben Arkush,
Mrs. H. O. Armour,
Benjamin Walworth Arnold,
Dr. William Aronstein,
B. M. Asch,
Mrs. M. Ascher,
Mrs. George H. Ashdown,
Mrs. E. S. Auchincloss,
Mrs. E. S. Auchincloss, Jr.,
John W. Auchincloss,
Harmon Spencer August,
Chellis A. Austin,
Charles F. Ayer,
Frank L. Babbott,
Jules S. Bache,
Isaac D. Bachmann,
Mrs. Earle Bailie,
Charles Baird,
Robert B. Baird,
Miss Charlotte S. Baker,
George F. Baker,
Stephen Baker,
Albert H. Baldwin,
George V. N. Baldwin, Jr.,
William D. Baldwin,
Ancell H. Ball,
Mrs. D. C. Ball,
Edward L. Ballard,
Louis Bamberger,
Mrs. Thomas H. Barber,
Percival M. Barker,
Mrs. John Hampton Barnes,
William M. Barnum,
Mrs. H. G. Bartol,
Mrs. Martha Battle,
George de Forest Barton,
Felice Bava,
Mrs. L. P. Bayne,
Jeremiah Beall,
John D. Beals,
Edward E. Bechtel,
Lewis Bechtold,
Frank Begrisch, Jr.,
Mrs. A. Frederick Behre,
Dr. Otto F. Behrend,
Frank N. Bell,
William B. Bell,
A. Beller,
Alex. Benecke,
Andre L. Benel,
Mrs. W. W. Benjamin,
J. Philip Benkard,
Bruno Benziger,
Mrs. Charles F. Berger,
E. R. T. Berggren,
Dr. Alice R. Bernheim,
Isaac J. Bernheim,
Charles L. Bernheimer,
Miss Rosie Bernheimer,
Dr. Israel I. Bernstein,
Philip Berolzheimer,
Edward J. Berwind,
Miss Ellen I. Betty,
Mrs. George Biddle,
Mrs. Sylvan Bier,
Nathan I. Bijur,
Samuel H. Bijur,
Raymond Bill,
C. K. G. Billings,
Richard Billings,
Cecil Billington,
Mrs. John F. Birch,
Miss Katherine H. Birchall,
Mrs. Charles E. Birge,
James C. Bishop,

George H. Bissinger,
Mrs. Robert C. Black,
Frederick S. Blackall,
H. C. Blackiston,
Mrs. Dexter Blagden,
Mrs. Emmons Blaine,
J. Insley Blair,
Isidore Blauner,
C. N. Bliss, Jr.,
Miss S. D. Bliss,
Mrs. Walter P. Bliss,
Samuel Shipley Blood,
Lewis M. Bloomingdale,
Mrs. M. J. Bluen,
Dr. Richard Blum,
Hugo Blumenthal,
Sidney Blumenthal,
Mrs. Albert B. Boardman,
Bradford Boardman,
Mrs. Philip W. Boardman,
Miss R. C. Boardman,
Mrs. Edward C. Bodman,
Henry W. Boettger,
Robert Boettger,
Theodore Boettger,
William H. Bolton,
Dr. Samuel Bookman,
Mrs. Howard S. Borden,
Mrs. Sydney C. Borg,
Louis Boury,
L. R. Bowden,
Miss Edith G. Bowdoin,
George T. Bowdoin,
Spotswood D. Bowers,
George P. Bowman,
John Hall Bowman,
John McE. Bowman,
Miss Mabel Boyd,
R. E. Boyd,
Mrs. Marius de Brabant,
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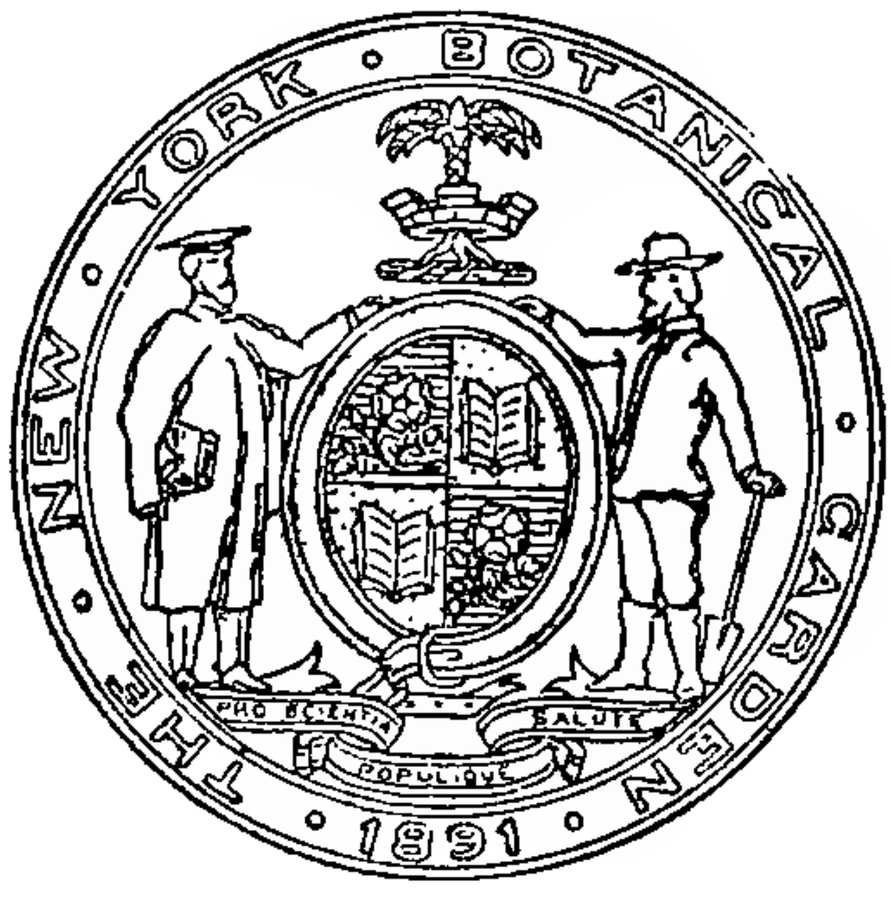
VOL. 13 No. 49

BULLETIN

OF

THE NEW YORK BOTANICAL GARDEN



ISSUED MAY 31, 1928

CONTENTS

Reports for the Year 1927

Report of the Secretary and Director-in-Chief 257

Report of the Head Curator of the Museums and Herbarium 261

Report of the Head Gardener 266

Report of the Honorary Curator of the Iris and Narcissus Collections 273

Report of the Director of Laboratories 278

Report of the Bibliographer 282

Report of the Librarian 284

Report of the Superintendent of Buildings and Grounds .. 304

Report of the Paleobotanist 309

Report of the Honorary Curator of the Economic Collections 312

Report of the Honorary Curator of Mosses 313

Report of the Honorary Custodian of the Local Herbarium 315

Report of the Chairman of the Board of Scientific Directors 316

Report of the Treasurer 318

Certificate of Auditors 319

Report of the Committee on Patrons, Fellows, and Members 324

BULLETIN
OF
The New York Botanical Garden

Vol 13 No. 49

REPORT OF THE SECRETARY AND DIRECTOR-IN-CHIEF FOR THE YEAR 1927

(*Accepted and ordered printed, January* 9, 1928)

TO THE BOARD OF MANAGERS OF THE NEW YORK BOTANICAL GARDEN.

Gentlemen: The work of the institution has been accomplished in close coöperation with the Department of Parks, Borough of the Bronx. Construction and development during the year have included the completion of the boundary wall and fence along Pelham Avenue and the Southern Boulevard, through the expenditure of contributions made by members to the Special Fund for Improvement of the Grounds; this is a very important addition to protection. The beautiful entrance piers erected at the junction of these streets through the generosity of Mr. Frank K. Sturgis are a noteworthy feature as a part of this enclosure. To prevent intrusion, the nursery and experimental grounds on the eastern side of the Garden have been enclosed by a woven-wire fence with a low concrete base, as recommended in my last annual report, and additional low railings have been erected along paths near two of the entrances. The electric lighting of the museum building, commenced in the spring under a city contract, has not yet been completed. Additional paths aggregating about 1,500 feet in length have been built near Conservatory Ranges Nos. 1 and 2, near the New York Central Railroad Station, and near the Linnaean Bridge Entrance. Continuation of the work on the path-system is very desirable, looking forward to its completion as soon as possible.

Work has been continued in filling and grading the valley in the southeastern part of the reservation, planned for a Rhododendron Glade, but the sewer connection needed for its drainage has not yet been built.

An appropriation of $15,000 by the city has been requested for the reconstruction of the area adjacent to land of Fordham University, made necessary by grading operations by the University mentioned in my last annual report; the need for this became more urgent during the summer, when the old drainage of this area, through the University grounds, became clogged, and the area flooded, requiring the closing of a much-used path.

A third model garden was laid out and partly completed, its plan having been chosen from competition with many others under the provisions of the H. H. Memorial Fund. Another similar competition is now in progress for a fourth model garden for construction and planting in 1928.

Police protection has been somewhat increased, and we have employed a few more keepers than in previous years, but guarding is still inadequate. If the city should return to its former Park Police system, under the immediate control of the Park Commissioners, a great improvement in conditions would, doubtless, ensue. All care possible has been taken of the natural features of the reservation to forestall damage by trampling or by fire.

Repairs to buildings included the reglazing of three greenhouses of Conservatory Range No. 1. Three others require reglazing during 1928. The chimney of Power House No. 1 was increased in height about forty feet, in pleasing design, in order to obtain better draft and more perfect coal combustion. Torrential rainfalls in summer and autumn made necessary extensive repairs to paths and banks. Much painting was required on fences, railings, and buildings.

Through some increase in the number of gardeners and laborers, improvement of maintenance of grounds and plantations has been effected, but the force is still insufficient to accomplish all that is desirable. The several plantations have been modified mainly by additions and substitutions.

Extensive floral displays have been continued in daffodils, irises, tulips, roses, cherries, lilacs, gladiolus, dahlias, rhododendrons, water-lilies, and chrysanthemums, and minor displays in a large number of other kinds of plants, both herbaceous and woody. The total number of species and varieties in the grounds and greenhouses is more than 17,000.

The museum and herbarium collections have been increased by the addition of many desirable specimens and their value heightened by studies of members of the staff and visiting botanists, effecting more detailed and accurate classification. These additions have been made in part by purchase, in part by exchanges of duplicates with other institutions, in part by gift, and in part through botanical exploration and collecting in the southern and central United States, the West Indies, and northern South America.

Much progress was made in cataloging and binding books, and the whole library was moved to obtain space for expansion provided by the new steel stacks obtained late in 1926. Noteworthy accessions were made during the year, bringing the number of bound volumes up to nearly 37,000.

Direct instruction has been continued through public lectures, demonstrations, docentry, and attention to some advanced students. Labelling of plants and specimens for the information of the public has also been continued; but additional assistance for this work is needed. Extra-limital instruction has been given by lectures to schools, garden clubs, and other organizations. A great amount of information has been given in reply to requests, by correspondence; the demand for such information is continually increasing.

Investigations have been pursued by members of the staff, students, and visitors over a wide range of subjects, including the floras of North America, the West Indies, and northern South America; the taxonomy of many plant families and genera; economic botany; floriculture; plant genetics; plant cytology and palaeobotany.

The serial publications of the Garden have been continued; their expansion is very desirable and assistance is

needed in editing them, in order to relieve members of the staff. They are continually obtaining wider circulation, and this distribution of information is important.

In order to take advantage of the possibilities for floral display, teaching, and investigation already provided by nearly four hundred acres of land, and the very extensive and valuable collections of plants, books and specimens which have been brought together, much greater endowment of the institution is required.

Details of operations will be found in reports by members of the staff hereto appended.

N. L. BRITTON,

Secretary and Director-in-Chief.

REPORT OF THE HEAD CURATOR OF THE MUSEUMS AND HERBARIUM

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I submit herewith my report as Head Curator of the Museums and Herbarium of The New York Botanical Garden for the year 1927:

The collections comprising the museums and herbaria of the Garden were conserved and developed as in past years.

Specimens were added to the collections as follows:

By gift and purchase.....	10,848
By exchange	7,489
By exploration	11,410
Total.....	29,747

About 5,000 specimens were sent to other institutions in exchange for other specimens.

Specimens were received from nearly all parts of America, from Canada to Argentina.

MUSEUMS

The several units comprising the public museums—the fossil-plant museum, the economic museum, and the systematic museum with its synoptic collection, microscope exhibit, plant-picture collection, and local-flora exhibit—were increased by the addition of specimens or renovated. It may be particularly mentioned that specimens were interpolated in the fossil-plant and economic collections; models of fleshy fungi were installed in the fungus exhibit of the synoptic collection.

The more important additions were derived through exploration in tropical America and adjacent regions, and by exchanges.

Label copy for the specimens of the entire economic museum was prepared and many labels were made and placed in the cases. No new equipment was added.

The development of the Economic Museum was under the supervision of Dr. H. H. Rusby, Honorary Curator of the Economic Collections. (For details see his report.)

The Fossil Plant Museum was under the supervision of Dr. Arthur Hollick, Paleobotanist. (For details see his report.)

HERBARIA

A substantial expansion of the general herbarium was made possible by the addition of thirty-two standard cases to the equipment. The past growth of the general herbarium necessitated the removal of some groups of specimens from the top floor of the museum building to the eastern wing of the second floor. This step necessitated the moving and rearranging of every pigeon-hole of specimens of the entire collection. The ferns and some of the monocotyledonous families were moved to the second floor. The lichens and mosses were placed in the room on the top floor formerly occupied by the ferns.

A total of 28,190 herbarium sheets, containing about 35,000 specimens were added to the permanent collections. Most of the material mounted came from continental North America, the West Indies and northern South America.

Specimens, limited in number, received for the Columbia University herbarium, were mounted and incorporated in that collection.

Two collections of a special character were:

I. The moss herbarium which was under the supervision of Mrs. N. L. Britton, Honorary Curator of Mosses. (For details see her report.)

II. The local flora herbarium which was under the supervision of Dr. H. M. Denslow, Honorary Curator of the Local Flora herbarium. (For details see his report.)

The more outstanding activities of members of the scientific staff are referred to below.

INVESTIGATIONS AND ASSISTANCE

Dr. P. A. Rydberg, Curator, had charge of the collection of flowering plants. During the first part of the year he

devoted his time largely to the transfer and complete rearrangement of the general herbarium, with the assistance of Messrs. Gleason and Wilson, and to the distribution of about 5,000 duplicate specimens to other institutions as exchanges. During the summer and fall the time available for research work was divided principally between the continued studies of the flora of the prairie and plain region between the Mississippi River and the Rocky Mountains, and to monographic work on the genus *Astragalus* and related genera. The monographic work has advanced so far that manuscript enough for two parts of the *North American Flora* has been turned into the hands of the editor, and a third part is ready, except the genus *Oxytropis*, which is nearly completed. In connection with this work he has published two papers in the Bulletin of the Torrey Botanical Club; viz., Notes on Fabaceae, VIII & IX, covering the genus *Hamosa;* two more papers of the series are in the hands of the editor. One part of *North American Flora,* containing the composite tribes Liabeae, Neuroleneae, and a part of Senecioneae, has been printed during the year. One article, "New Species from the Blue Ridge," was printed in *Torreya.* Two illustrated lectures were given during the summer at Lutherland, Pocono Summit, Pennsylvania.

Dr. H. A. Gleason, Curator, in continuation of his work of preceding years, devoted his time almost wholly to a study of the flora of northern South America. This has included the care of the collections received, among which the largest is that of the expedition of Messrs. Killip and Smith in Colombia, amounting to almost seven thousand numbers; the identification of material, especially in the Melastomataceae, Malpighiaceae, Sapindaceae, and Hypericaceae; and the preparation of manuscript covering the Melastomataceae for the proposed Flora of British Guiana. The latter work was greatly aided by the loan from the Royal Botanic Gardens at Kew of nearly six hundred sheets of Guiana material. He published six articles, aggregating 228 pages, and several abstracts of current literature for

"Biological Abstracts." He has also aided from time to time with the classes of high school pupils which visited the Garden, and has delivered four of the public lectures.

Dr. Fred J. Seaver, Curator, continued to look after the mycological collections. An attempt was made during the year to mount up the large quantity of material which has accumulated for several past seasons, and to arrange the entire collection in consecutive order. Research work on the Discomycetes for the whole of North America was continued; also on the Ascomycetes in general of the West Indies. These latter studies are preliminary to what is hoped to be a general treatment of the fungi of all of the West Indies, the Porto Rican list being used as a nucleus around which to build. Much time was also spent on the study of miscellaneous collections of fungi sent in from various localities for determination. Dr. Seaver continued to edit *Mycologia*, the volume for the year comprising 338 pages, a considerable increase over previous volumes. He took his turn on the public lecture courses and has published a number of research papers. In the absence of a pathologist, Dr. Seaver has continued to act in this capacity so far as other duties would permit. Some time has been spent looking after insect depredations in the Garden and gaining information on the best methods of control.

Mr. Percy Wilson, Associate Curator, continued his studies of West Indian plants. He has also studied the families Batadaceae, Petiveriaceae, Tetragoniaceae, Basellaceae, and the genus Portulaca preparatory to a monograph of these groups for North American Flora. Mr. Wilson determined many specimens and collections of specimens for other institutions. He continued his week-day afternoon docentry and had charge of a large number of classes from both public and private schools.

Mrs. William Mitchell, Associate Curator, completely relabelled the families of the general herbarium of flowering plants, a task necessitated by the rearrangement of the collection referred to above, with new case labels, renovated the mounted material of the Scrophulariaceae and the Ru-

biaceae to Carduaceae (partly inclusive), and made tables to render the genera and species of certain families more readily accessible. She helped in the sorting of mounted specimens for distribution, in preparing miscellaneous duplicate specimens for distribution as exchanges, and made the entries of several special collections in the record books. In the case of the local herbarium, mounted specimens were distributed in the cases, and much progress was made in sorting and labelling the specimens of the Bicknell herbarium, in which now over 8,500 sheets have been labelled.

The undersigned, in addition to curatorial routine, devoted his time to investigation and exploration, and to the interpretation of the studies involved. His field work consisted of two short periods of exploration in the Gulf Region; one in April, covering the Gulf coast region from Florida to Louisiana; the other in parts of November and December, confined to Florida. These trips were made principally for the collection of herbarium and museum specimens, general and special information, collection of living material (plants and seeds) for illustration in *Addisonia*, and particularly live material of iris and spiderlilies in continuation of our studies now in progress for several years. He also prepared manuscripts of narratives of exploration and special papers for publication, and printed seventeen papers dealing with the plants of the southeastern United States. Living material for study was introduced into the reservation of Mrs. Arthur Curtiss James at Coconut Grove, Florida, with her permission, and our thanks are given to Mrs. James for arranging the motor transportation for our fieldwork.

Respectfully submitted,

JOHN K. SMALL,

Head Curator of the Museums and Herbarium.

REPORT OF THE HEAD GARDENER

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

HORTICULTURAL OPERATIONS

Sir: I have the honor to submit herewith my report as Head Gardener for the year 1927.

The gardening staff, under the direction of Messrs. John Finley and H. W. Becker, Foremen-Gardeners, consisted of 30 gardeners and 16 laborers. The outside force, under the direction of Mr. Finley, after finishing the winter tree work, spent the major part of the season in flower garden work. Chrysanthemum, Phlox, Rose, Iris, and Peony collections and the conservatory beds, were cared for. The 1927 Prize Garden was begun. Two beds of Japanese iris were replanted and two new iris beds, one peony bed and two chrysanthemum beds were made. The tulip display beds were prepared and planted with 73,450 bulbs, the conservatory court with 26,750 of Early Singles, Cottages, Doubles, and Mendels, the remaining 46,700 Darwins and Breeders having been planted in the Horticultural Grounds; 424 tulips given by John Scheepers, Inc., were also planted in the Conservatory Court.

Eight trees were planted along roads and paths; 72 trees were planted in the Pinetum; 66 trees were planted in the Arboretum; 282 trees were planted in the Red Pine Forest; 288 shrubs were planted in the Fruticetum and 146 shrubs in the Fruticetum Decorative; 84 trees and shrubs were planted around the new entrance at Pelham Parkway and Southern Boulevard; 74 shrubs were planted at the 200th Street Entrance. There were 4 specimens planted in the Dwarf Collection, and among the late-blooming shrubs 2 species and varieties. The laying out of the tulip and flower collections was under the direction of Mr. John Hartling, Head Gardener's Assistant.

GREENHOUSE OPERATIONS

The greenhouse force, under the direction of Mr. Becker, has maintained the indoor collection as usual. The plants

in House No. 1, Range No. 1, consisting of palms, were transplanted into larger tubs. One *Phoenix* was transplanted from a 42-inch tub into the ground and a rockery built around it, as were one *Coccothrinax argentea* and one *Howea Forsteriana,* two of the largest palms of their kind under glass, ranging from 25 to 40 feet in height, with a spread of 18 to 25 feet.

In House No. 4, one of the largest *Ficus benghalensis,* 43 feet in height, with a spread of 45 feet was pruned back on account of growing out of the roof and one *Ficus elastica,* 38 feet high, with a spread of 40 feet, was transplanted into a larger tub. In House No. 6, one *Aloe arborescens,* one *Carnegiea gigantea,* one *Beaucarnea recurvata,* and three *Euphorbia abyssinica* were transplanted into the ground and rockeries built around them. In House No. 11, all the large banana plants were transplanted into larger tubs and the whole house rearranged so as to give the plants more room. In House No. 13, one large *Neowashingtonia robusta,* 47 feet high, had to be cut down on account of breaking through the glass at the top of the roof. Three other *Neowashingtonia robusta* were moved to the middle of the house. They are 25 to 40 feet in height. *Agathis alba* was transplanted in the ground and a rockery built around it; it was 54 feet high and had to be pruned back 10 feet. All plants in Houses Nos. 12, 14, and 15 had to be transferred to Houses Nos. 1 and 13, on account of reglazing and painting of these houses. As soon as alterations were completed, the plants were returned to the houses they belonged in. General transplanting, potting, and pruning in all the other houses were carried on during the year. The following plants were raised for exhibition in the Central Display House of Range No. 2: 120 Hippeastrums, 150 Primulas, 95 Begonias, 30 Impatiens, 130 Fuchsias, 300 Chrysanthemums, 50 Pelargoniums, 87 Gloxinias, and 76 Hydrangeas, making a total of 988 plants. The Chrysanthemums given by Elmer D. Smith & Co. of Adrian, Michigan, in 1925 and 1926, were the feature exhibition. An increasing number of seedlings were raised for the systematic collections, the

rock garden, the flower gardens, and nurseries, as well as plants for Dr. Small's studies of native irises and for Dr. Stout's researches; also several thousand bedding plants.

SYSTEMATIC PLANTATIONS

Herbaceous Grounds. There have been 200 species of plants added to the collections this year through seeds, gifts, and collections, these being distributed over about 20 families. With these additions, this collection now contains about 1,700 species, which, added to those of the Rock Garden, Flower Gardens, and Nurseries, give the garden a collection of nearly 4,000 species of herbaceous plants.

Woody Collection. Seventy-four species and one genus of hardy woody plants new to our collections have been raised from seed this year, increasing the plants in the Nursery available for the collections.

Conservatories. About 25,344 plants are now in our Greenhouse collection, including 9,186 in Range No. 1; 9,735 in Range No. 2; and 7,423 in the Propagating Houses and cold frames. Eighty-two varieties of Water-lilies, 250 plants, were shown in the Conservatory Court.

MISCELLANEOUS COLLECTIONS

Rose Garden. 1,500 hybrid tea and hybrid perpetual, polyantha, and climbing roses for replacements, also 40 new varieties, were added to the garden this year by Bobbink & Atkins, of Rutherford, New Jersey.

Dahlia Garden. 425 varieties, represented by 1,000 plants, were grown in the Dahlia Border, under the direction of Dr. M. A. Howe.

Iris Garden. The Iris collection contains now about 1,156 varieties, 7,232 plants, including the alphabetical and nursery collections. 3,618 plants of American native Irises, collected by Dr. Small and others, were added to this collection.

Narcissus Collection. This collection contains 61,200 plants of 146 varieties in massed and naturalistic planting the same as last year.

Hyacinth Display. This display has been distributed into the flower beds.

Gladiolus Collection. The Gladiolus collection now contains about 2,587 bulbs in about 126 varieties.

Variegated Plant Collection. Sixty-eight varieties, 500 plants, were displayed in the variegated plant bed.

Hardy Chrysanthemum Collection. 90 varieties, 1,080 plants, were grown for this display.

Peony Collection. This collection now contains 240 varieties, 503 plants. Seventy-six single peonies have been planted in the new bed.

Phlox Collection. This collection contains 30 varieties, 330 plants.

Lilac Garden. The Lilac collection consists of 560 plants of 186 named varieties.

Canna Collection. 1,060 plants, 64 varieties.

Tulip Display. 73,450 in 167 varieties, were given by the Dutch Bulb Exporters' Association; 424 in 53 varieties were given by John Scheepers, Inc.

Coleus Collection. This collection consisted of about 4,000 plants in 10 varieties and was planted along the West Border.

Mallow Collection. This collection remains the same as last year.

Rock Garden. 5,150 plants were added to the Rock Garden in 1927 under the direction of Dr. E. B. Southwick. Many of them were raised and received by exchange, but the greater part was collected by Dr. Southwick. Mrs. W. H. Peckham presented many bulbs, and quantities of plants raised by Dr. Southwick from cuttings and seed made the Rock Garden a great attraction to visitors.

Dwarf Collection. This collection contains 66 plants in 28 varieties.

LABELING, RECORDING, AND HERBARIUM

Under the direction of Mr. John Hartling, Head Gardener's Assistant, with one label boy for four and one-half months, a total of 2,353 labels have been made and placed,

including 69 for Fruticetum, 233 for the Arboretum, 14 for the Pinetum, 15 for the Horticultural Grounds, 74 for Conservatory Range No. 1, 177 for Conservatory Range No. 2, 175 for Conservatory Beds, 8 for the Herbaceous Grounds, 336 for the Dahlia Border, 185 for the Rose Garden, 10 for the Morphological Gardens, 124 for the Tulip display, 21 for the Dwarf Collection, 3 for the Coleus Collection, 109 for the Gladiolus Collection, 95 for the Narcissus Collection, and 400 for Roads and Paths; 3,000 pot labels were cleaned and painted. Accession numbers 57,910 to 59,144 have been recorded, making a total of 1,234 accessions for the year. 2,827 packets of seed were received, 200 of these have been collected by this department on the grounds; 27 were received by gift, 1,991 by exchange, 600 by purchase, 9 by collection. 77,610 bulbs were received and 6,683 plants; of the latter, 172 were by gift, 4,180 by collection, 785 by exchange, 724 by purchase, and 822 from seed. Two hundred fifty specimens were gathered from the garden collection and 1,000 have been poisoned and mounted by John Borin, for the cultivated-plant herbarium.

This department has collected material for schools, for nature study and college classes in botany, and exchanged living plants with institutions and parks.

SUMMARY FROM ANNUAL REPORT

Accessions:

Plants received	6,683	
Bulbs "	79,697	
Seeds (packets) received	2,827, including 200 collected by members of this Dept.	

Displays:

Narcissus	61,200	146 varieties	
Tulips	73,874	220	"
Iris	3,431	1,297	"
Peony	503	240	"
Rose	4,550	280	"
Dahlia	1,000	425	"
Chrysanthemum	1,080	120	"

Cannas	1,060	64 varieties
Lilac	560	85 "
Mallow	560	
Variegated Plants	510	68 "
Dwarf Plantation	66	28 "
Fall-flowering Shrubs	85	11 "
Gladiolus	2,587	126 "
Iris for Nursery	3,813	99 "
Rock Gardens	5,150	

Planting Additions:

Gladiolus	2,087 bulbs	120 varieties
Tulips	73,874 "	220 "
Crocus	2,000	in Conservatory Beds
Dwarf Plantation	4	plants
Lilies	400	bulbs
Arboretum	66	plants
Fruticetum	288	"
Pelham Ave.	148	"
Pinetum	72	"
Pine Forest	282	"
Fruticetum Decorative	146	"
Rose Garden	50	" 40 climbing varieties
Rose Garden Bank	27	"
1927 Prize Garden	5	shrubby plants and many others.
New Entrance at Pelham Avenue	84	shrubs and small trees
200th Street Entrance	74	plants
Conservatory Beds	78	"
Conservatory Beds	152	" of Hemerocallis from Dr. Stout
Dwarf Plantation	4	"
West Border	4	"
Road and Paths	8	"
Morphological Garden	5	"
White Pines rearranged	40	"

Young Chamaecyparissus put in Nursery	436	plants
Compost Pile	11	"

LECTURES

I have delivered four lectures in the regular courses.

KENNETH R. BOYNTON,
Head Gardener.

REPORT OF THE HONORARY CURATOR, IRIS AND NARCISSUS COLLECTIONS

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

NARCISSI

Sir: I have the honor to submit herewith my report as Honorary Curator of the Iris and Narcissus Collections for the year 1927.

When the original natural plantings of Narcissi were made, we had at our disposal a large number of the trumpet varieties and, as it was doubtful if they would succeed very well in the heavy grass at that location, the plantings were made slightly thicker than would have been the case with varieties known to be "grass-proof." To our astonishment these trumpet varieties increased enormously and the effect was rather crowded. This has been relieved by judicious thinning in order to give a more natural appearance, and the many thousands of bulbs obtained have been used to plant the sides of the walk that runs from the Fordham Entrance to the Iris Garden Gate. We also made additions to places where there were unattractive and formal straight edges to plantations, such as among the Mallows, behind the collection beds, along the Memorial Plantation of Douglas Fir, and among the new evergreens that are now between the Alphabetical Iris Garden and the Narcissi. Besides all this, we planted the edges of the wooded land along the drive that leads to the Iris Garden Entrance. We have endeavored to improve this drive and it is hoped that this next summer we will be able to do more thinning and complete the edge of the woodland and join up the plantation at the Iris Garden Gate with the planting done along the Rock Garden path. As the fence and gates were in course of construction, we were forced to leave this end for another year, finishing only as far as the Alphabetical Iris Garden. All these plantings will improve as time goes on and we expect to see some real results

in the spring of 1929. The crowds of visitors attracted each spring seem to show that this effort has not been in vain.

ALPHABETICAL IRIS GARDEN

Fine evergreens planted between this garden and the Narcissus collection have helped the general effect very considerably. The Iris plants received have been held in a reserve bed to be added as needed. During the blooming season we checked over the plants, discarding mistakes and filling the gaps where we had the varieties. A few of the larger clumps were divided and the surplus sent to other test gardens. We propose to *thin* this planting after flowering this summer and distribute the surplus. Two new beds were dug and varieties of later introduction than those already arranged were temporarily planted there. As there are many empty spaces, probably because the varieties are obsolete, we are planning to fill these gaps with these later introductions not already in this garden and with names beginning with the same letter as the names in the near vicinity.

COLOR PLANTING

Plants here were checked also and mistakes corrected or discarded. Good varieties were spread to fill spaces and some sorts, of which we had too large a number, were cut down. New plantings were made with varieties from the Trial Garden given to us by the originators. This garden was a very beautiful sight when in bloom. The beds of Dwarf Irises in the center began to flower very early in April and there were still flowers of the Tall Bearded varieties at the end of June. It was noted that the blue bed was dull in color effect and we propose to introduce some pale yellows and whites to lighten it and throw the blues into relief. A special effort will be made to plan this change during the next flowering season. Both here and in the Alphabetical Garden a dressing of ground-limestone was given during the summer. Plants were distributed to other test and display gardens in considerable numbers and were

used also as prizes for an American Iris Society show held in New Rochelle in June.

BEARDLESS IRIS GARDEN

Here there was a very great loss of plants, owing to the open winter, three hundred and ninety-five native varieties having taken their departure for the Elysian fields. The mortality took place among varieties from Louisiana and swampy districts of Florida. The Texas and North Carolina varieties seem to be quite hardy. However, only two winters to test their hardiness would not be enough time to draw any definite conclusions about any one variety. The beds were again filled with newly collected plants of Dr. Small's, sixty-seven "labels," four hundred and sixty plants being used. Miss Chandler crossed many of the varieties, collected the seed and planted them and some are beginning to appear above ground. We need more Sibirica varieties. Twenty-six species were given to Mr. Boynton to replant the Iris beds in the Herbaceous Garden.

TRIAL PLOT

The plants judged in 1927 and 1928 were lifted, divided, and returned to the originators that wished them. We received, through the very great generosity of these owners, many plants for our color planting and for distribution to other test gardens. During the summer eighteen plants were received from six originators for judging in 1929 under the American Iris Society plan.

NURSERY

Dr. Small's spring collections were planted in three ways, in pots for the frames or houses, in the Nursery and in the Beardless-Iris Garden. He also distributed a great many. The last lot collected had to be potted, as it was too late to risk them out of doors. Those planted in the Nursery in the spring made a good growth and a few of them flowered in the autumn and paintings of them were made. Boards, set up on edge, have been put along the rows, and branches of

deciduous trees with a sprinkling of hay have been put over the top; so it is hoped that enough of the plants will be left to give good flowers this spring. The new Breeding Garden under Dr. Stout was started, the ground being dug, and seedlings from Mr. Moore's crosses being planted. Plants purchased by the American Iris Society and given by Mr. B. Y. Morrison have been added. Other plants are being ordered at present.

STATISTICS

Alphabetical Garden. Added, 42 varieties. Discarded, 14 varieties.

Color Planting. Added, 61 varieties, 257 plants. Discarded, 9 varieties.

Beardless-Iris Garden. Added, 67 "labels," 460 plants. Loss, 395 plants.

Reserve Beds. Discarded, 35 varieties.

Trial Plots. Received for judging 1929, 18 plants from 6 originators.

Nursery. Collected in spring, planted in pots, 72 varieties, 412 plants. Collected in spring, planted in nursery, 72 varieties, 2,099 plants.

Breeding Garden. Received through purchase A. I. S., 40 varieties, 113 plants. Derived from collected seed, 71 plants, 8 collectors.

Total plants received other than those taken from Trial Plot: Collected, 4,490; Gifts, 355.

COLLECTORS

E. J. Alexander, North Carolina; Mrs. I. W. Auld, South Carolina; Mr. Beadle, North Carolina; Miss M. Bissell, Florida; F. W. Campbell, Michigan; H. M. Hall and A. A. Heller, California; Mrs. W. H. Peckham, Vermont; Rainbow Gardens and Dr. J. K. Small, Florida and Louisiana; A. Svihla and R. D. and A. Svihla, Louisiana; Dr. E. T. Wherry, Indiana. The largest number collected was 3,318 by Dr. Small.

DONORS

J. K. Alexander, William N. Arnold, S. S. Berry, Miss M. Bissell, Mrs. M. E. Black, F. W. Campbell, Mrs. R. M. Davis, Mrs. M. I. De Graaff, Mrs. G. Dyer, The Garden of Arcadin, Prof. R. A. Greene, C. H. Hall, Howard Judson, Frank Koehler, Mrs. C. S. McKinney, J. J. Moffitt, Jr., F. Cleveland Morgan, B. Y. Morrison, Col. J. C. Nichols, J. F. Otis, Mrs. W. H. Peckham, O. M. Pudor, Ramsey's Austin Nursery, Royal Botanic Gardens, Kew, through W. J. Bean, H. P. Sass, Jacob H. Sass, Mrs. A. H. Scott, J. Marion Shull, Jacob Shulz, Mrs. Charles H. Stout, Miss Grace Sturtevant, Howard Weed, and E. B. Williamson.

Respectfully submitted,

ETHEL ANSON S. PECKHAM,

Honorary Curator, Iris and Narcissus Collections.

REPORT OF THE DIRECTOR OF THE LABORATORIES FOR THE YEAR 1927

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

GENERAL MATTERS

Sir: I submit herewith my annual report for the year 1927.

During the year there have been obtained for the laboratories, one paraffin oven, two constant-temperature ovens, one drying oven, and one refrigerator which is especially equipped to give constant temperatures as low as near 32° Fahrenheit. All these are operated with electricity. Two new binocular dissecting microscopes, a photo-micrographic camera, and various minor pieces of apparatus have also been obtained for the more general needs of the staff. These have entailed an expenditure of $1,500. An expenditure of $1,000, requested for next year, will meet our present needs quite fully as far as the laboratory space will admit.

On September 1st, Miss Clyde Chandler became technical assistant, filling the position left vacant by the return of Mr. T. Susa to his native land.

My coöperation with The Horticultural Society of New York as secretary of the International Conference on Flower and Fruit Sterility and as editor of the proceedings of this Conference has culminated during the year in the publication of these proceedings as a memoir of the Society.

The usual routine duties that fall to me have been performed as in the previous years and need no special enumeration here.

PERSONAL RESEARCH

Problems involved in the sterility and the fertility of plants and in plant-breeding continue as my major lines of effort.

The studies with day lilies (Hemerocallis). Most encouraging results have been obtained in the work with day lilies.

Various of the seedlings that bloomed for their first time this year have given new types of flower colorings, among which the eyed patterns and the pink and red colorings are very attractive. Some of these will no doubt prove valuable as floricultural plants. The collection of species and seedlings is being utilized for further experimental and cytological studies in sterility.

Studies with species of Lilium. In our studies of lilies it has become very evident that diseases, hitherto mostly unrecognized, are responsible for the death of many lilies in gardens and in greenhouse culture. The spread of destructive diseases of the mosaic and virus types is, I believe, largely responsible for our failure to make the desired progress in breeding and rearing lilies from seed, the plans of which have been presented in a special report* and have been mentioned in various of these annual reports.

I am much gratified to be able to record here that during the past year the study of lily diseases has been organized under the coöperation of the Horticultural Society of New York, the Department of Plant Pathology of Cornell University, the Boyce Thompson Institute for Plant Research, and The New York Botanical Garden. The articles of agreement in this coöperation were ratified by the authorities of The New York Botanical Garden and are on file. An investigator, Mr. Carl S. Guterman, has been secured, who is devoting nearly all his time to the study of the diseases of lilies. It is the plan to keep only healthy lily plants in the experimental plots and display plantings at the Garden and to determine how lilies may be maintained free from disease in general garden culture.

Papers reporting on experiments and on the results of our studies with lilies are being printed from time to time.

Sterility in Irises. This year the American Iris Society again provided for a scholarship for further work with Irises. Miss Clyde Chandler was granted the scholarship

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* Preliminary report of investigations with species of *Lilium.* Jour. N. Y. Bot. Garden 23:155-158. 1922.

and the efforts were devoted to breeding along lines decided by the Society. Special efforts were made to hybridize the red-flowered southern species *Iris fulva* with hardy northern species.

Coöperation with the New York Agricultural Experiment Station. Beginning with the autumn of 1919, I have been permitted to coöperate with the Department of Horticulture at the New York Agricultural Experiment Station in the investigations of sterility in various fruit crops and in the project of breeding to produce new varieties of seedless grapes hardy in the climate of New York State. One such new grape has now been produced which gives promise of value and this stimulates us to further efforts in this work. During the past year about 1,000 seeds were obtained—all with such pollen parents as Panariti, Black Corinth, Black Monukka, Sultanina, Sultanina Rose, and the new seedless seedling. Various seedlings of earlier breeding are yet to bloom. All the seedlings obtained in these cross-pollinations are being grown to maturity under the supervision of the Department of Horticulture at the New York Agricultural Experiment Station.

Tests for determining the pollination requirements of important fruit crops are being continued. In several respects these should be extended.

Investigations with poplars. This project is made possible by the coöperation of the Research Department of the Oxford Paper Company. The object is to produce hybrid poplars that are of value in reforestation for pulp wood. About 13,000 hybrids have been obtained, involving nearly 100 combinations between species. A nursery has been established at Frye, Maine, where the best of these seedlings are being propagated as rapidly as possible. Mr. E. J. Schreiner has continued in this work with the assistance of several persons in the employ of the Oxford Paper Company.

Other Investigations. Studies of various types of sterility, of variegation, and of doubleness of flowers are being continued with various plants that can be grown in the

experimental greenhouse. But in these there are no new projects other than those mentioned in the report for 1926.

REGISTERED STUDENTS AND SCHOLARS

During the year, the following persons have been enrolled at the Garden, either as recipients of scholarships or as students registered for credits in Columbia University:

Bowers, Clement G., the Breeding of Rhododendrons and Azaleas.

Fay, Dolores Joan, Plant Breeding.

Fiske, Winifred Amy, Plants used by Indians.

Goodlatte, Amelia R., Plant Breeding.

Krauss, Gertrude H., Plant Breeding.

Schreiner, Ernst J., Breeding, Pathology and Taxonomy of the genus *Populus*.

A. B. STOUT,
Director of Laboratories.

REPORT OF THE BIBLIOGRAPHER

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: The usual assistance has been afforded to members of the Garden staff and visitors consulting the library. Appeals for bibliographic data are now received in increasing number from workers in other institutions, and the information asked is given, if possible, unless this would require an amount of investigation that would interfere seriously with my other routine duties, such as bibliographic and editorial work.

Work on *North American Flora* has been progressing rather more satisfactorily than in some recent years, but is still far from being as rapid as is desirable. Two parts have been issued during 1927: Volume 34, part 4, in June, and volume 7, part 12, in October. Work is well under way upon two volumes, 18 and 23, of which nothing has yet been published. The first part of volume 23 will doubtless appear in January, and more will follow quickly. No definite promises can yet be made to subscribers, however, in the case of volume 18. Enough material for one part is already in type and much more is in the hands of the printers; several parts, however, will be devoted to a single genus, *Carex*, and the author wishes to get as much of this as possible into type at the same time, before any of it is published.

Of *Addisonia*, five numbers have appeared during 1927: the last of volume 11 and all four of volume 12. Of the current volume, the first, second, and fourth numbers appeared strictly on time, a record for promptness that has not been attained since volume 5. At first glance it may seem strange that there should be delays in getting out once in three months a publication with only 16 to 24 pages and 8 plates; but the text is written by various contributors, and the mechanical work is done by three different firms, in two cities, and delay of any of those concerned makes itself felt.

There has been no single large collection of books purchased for the library during 1927, but the number of individual volumes bought has been more than six times the average of recent years; these all go through the hands of the bibliographer for his approval, and most of them are selected by him. When the number is large, as this year, the amount of time needed for this work merits mention, although usually ignored in my annual report.

The bibliographer has given two lectures in the regular public lecture courses of the Garden, and has accomplished a very small amount of taxonomic investigation.

JOHN HENDLEY BARNHART,
Bibliographer.

REPORT OF THE LIBRARIAN

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: The moving of the library, which was commenced late in 1926, was completed in the spring of the present year. Under the new arrangement, works on general science, both periodicals and the publications of societies and institutions, also those on geology and palaeobotany, occupy the rotunda and annex No. 1; general works on botany, botanical periodicals, the publications of botanical societies and institutions, floras and books treating of the taxonomy of phanerogams are in the main stack-room; works on cryptogams, pharmacognosy, and agriculture (in part) are in annex No. 2, while the laboratory stacks are filled with the publications of the state experiment stations and the U. S. Department of Agriculture and works on horticulture, forestry, and landscape architecture.

There has been a notable increase in the number of purchases during the past year, the greater proportion being works on floriculture and landscape architecture. This department now compares favorably with other strictly horticultural libraries.

There have been added to the collection of bound volumes by purchase, 877, including 345 items of the Barnhart library purchased in 1926 but not hitherto accessioned; by gift 36; by exchange and deposit 19; and by binding 501, including 30 volumes belonging to Columbia University (exclusive of 24 which were re-bound).

The bound additions for 1927 therefore number 1,433, which, added to the total number in the library on December 31, 1926, 35,513, make a total of 36,946.

In addition to the 345 bound volumes of the Barnhart library mentioned above, there have been accessioned 410 unbound volumes and pamphlets. The work of accessioning this library is now about half completed; it is necessarily slow, since the task of cataloguing devolves entirely upon the librarian, with occasional advice from the bibliographer and clerical assistance in typing only.

The principal accessions have been listed, as heretofore, in the *Journal.*

Approximately 2,000 pamphlets remaining from the Geneva purchase of 1923 have been sorted and alphabetized but the work of cataloguing still remains.

The total number of catalogue cards typewritten and filed during the year was 2,766; those issued by the Torrey Botanical Club and filed, 4,872. Four boxes of new species cards issued by the Gray Herbarium have also been filed in their special cases, which, as stated in the last report of the librarian, are again becoming crowded.

The granting of an additional clerical assistant in the autumn has made it possible to revise the current serial list appended to the report of the librarian for 1921 (BULLETIN **12**:41-61, and supplemented in **12**:139, 211-212; **13**:33, 126, 208). There has of necessity been a large amount of correspondence connected with this work, and since replies from some distant countries have not yet been received it is possible that some changes may have to be made in the list before its final printing.

SARAH H. HĀRLOW,
Librarian.

LIST OF SERIALS

* Serials subscribed for by the Garden.

† Serials subscribed for by Columbia University and deposited at the Garden.

‡ Serials received in exchange by the Torrey Botanical Club and deposited at the Garden.

§ Serials whose receipt is temporarily interrupted.

All others are received in exchange by the Garden.

Agricultural	Experiment	Station,	Auburn, Ala.	[*Publications.*]
"	"	"	Tuskegee, Ala.	"
"	"	"	Sitka, Alaska.	"
"	"	"	Tucson, Ariz.	"
"	"	"	Fayetteville, Ark.	"
"	"	"	Berkeley, Calif.	"
"	"	"	Fort Collins, Colo.	"

Agricultural	Experiment	Station,	Auburn, Ala.	[*Publications.*]
"	"	"	New Haven, Conn.	"
"	"	"	Storrs, Conn.	"
"	"	"	Newark, Del.	"
"	"	"	Moca, Dom. Rep. W. I.	"
"	"	"	Gainesville, Fla.	"
"	"	"	Experiment, Ga.	"
"	"	"	Guam.	"
"	"	"	Honolulu, Hawaii	"
"	"	"	Moscow, Idaho	"
"	"	"	Urbana, Ill.	"
"	"	"	Lafayette, Ind.	"
"	"	"	Ames, Iowa	"
"	"	"	Manhattan, Kan.	"
"	"	"	Lexington, Ky.	"
"	"	"	Baton Rouge, La.	"
"	"	"	Orono, Me.	"
"	"	"	College Park, Md.	"
"	"	"	Amherst, Mass.	"
"	"	"	East Lansing, Mich.	"
"	"	"	University Farm, St. Paul, Minn.	
"	"	"	Agricultural College, Miss.	"
"	"	"	Columbia, Mo.	"
"	"	"	Bozeman, Mont.	"
"	"	"	Lincoln, Neb.	"
"	"	"	Reno, Nev.	"
"	"	"	Durham, N. H.	"
"	"	"	New Brunswick, N. J.	"
"	"	"	State College, N. M.	"
"	"	"	Geneva, N. Y.	"
"	"	"	Ithaca, N. Y.	"
"	"	"	Raleigh, N. C.	"
"	"	"	Agricultural College, N. D.	"
"	"	"	Wooster, Ohio	"
"	"	"	Stillwater, Okla.	"
"	"	"	Corvallis, Ore.	"
"	"	"	State College, Pa.	"
"	"	"	Mayagüez, Porto Rico	"
"	"	"	Kingston, R. I.	"
"	"	"	Clemson College, S. C.	"
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"	"	"	College Station, Tex.	"
"	"	"	Logan, Utah	"
"	"	"	Burlington, Vt.	"
"	"	"	Blacksburg, Va.	"
"	"	"	St. Croix, Virgin Islands	"
"	"	"	Pullman, Wash.	"
"	"	"	Morgantown, W. Va.	"
"	"	"	Madison, Wis.	"
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REPORT OF THE SUPERINTENDENT OF BUILDINGS AND GROUNDS

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to submit the following report for the year 1927.

REGULATING AND GRADING

During the past year considerable regulating and grading of the paths of the Garden has been accomplished. The two sides of a path that was built on the western border from the plaza of the New York Central Railroad to the 200th Street Entrance were graded and sodded. At the Linnaeus Bridge Entrance the gutters on the two sides of the road were graded and sodded for a distance of 500 feet, and a gutter 175 feet long was graded and sodded in the Rose Garden.

Contractors working in the vicinity of the Garden who were looking for a convenient place to dispose of soil unearthed from excavations have continued to cart large amounts of this soil into the grounds. During the past year they brought in about 10,000 yards of earth. We have been filling in the bottom of the valley of the Long Lake and 8,500 yards of this soil were placed along its eastern side. To complete the grading at the 200th Street entrance, 300 yards were used. There were 1,200 yards of excellent topsoil taken from the excavations, which have been stacked for potting purposes.

From January to April and during the month of December, eight men were assigned to continue the work of filling in the Long Lake, which is now about one-half filled.

DRAINAGE

One catch-basin and 42 feet of 6-inch drainage pipe were used for drainage at the Iris Garden Entrance. Three culverts 12 inches by 18 inches by 40 feet were built to drain the gutter north of the Linnaeus Bridge Entrance. At the 200th Street entrance a catch-basin and 54 feet of 6-inch

drain-pipe were used to drain the gutters. In order to make a connection with the sewer from the pump-room at Power House 2, a cut 12 feet deep, 8 feet wide, and 50 feet long was made. Wherever it was necessary, repairs were made to the culverts and catch-basins throughout the Garden.

WATER SUPPLY

The water systems of the Museum Building, Conservatory Ranges 1 and 2, the Propagating Houses, the stables, the comfort stations, and all of the drinking fountains around the grounds received extensive repairs. A new fire hydrant has been installed on the main driveway east of the Museum Building to replace one broken by an automobile.

PATHS

In order to connect the plaza of the New York Central Railroad entrance with the 200th Street entrance, a 10-foot path 336 feet long was built and a branch path running from this path to Conservatory Range 1, 10 feet wide and 267 feet long was constructed. At Model Garden 3 a 10-foot path 120 feet long and a flagged path 45 feet long and 4 feet wide were built. The path at the Linnaeus Bridge Entrance was extended for a distance of 240 feet along the Bronx River. A 10-foot path 150 feet long was built to complete the connecting path to the west gate. At the Iris Garden Entrance the paths were changed to meet the new gate-post and the path at the north side of the Rose Garden was extended 175 feet in an easterly direction. At Power House 2 a 10-foot path 210 feet long was made ready for Telford stone. The hill paths leading to Conservatory Range No. 1, Iris Garden, and Japanese Cherry Collection were given a coat of Tarvia and a light cover of ashes.

BUILDINGS

The steam and water systems of the Museum Building and the window sashes and doors received necessary repairs. The lecture hall, the east wing of the basement, and the top floor of the Museum Building have been wired and

are now ready for the use of electricity. Two coats of paint were given to the east wing on the second floor of the Museum Building. A wall case 38 feet 6 inches long, 5 feet 9 inches high, and 15 inches deep, and four herbarium cases were built and placed in the herbarium. A new telephone monitor with five new extensions was installed on the first floor of the Museum Building.

The interior and exterior of Houses 12, 14, and 15 of Conservatory Range 1 received two coats of paint; the roofs of these houses were reglazed and the sash bars replaced. The three-inch copper leaders were replaced in Houses 9, 10, 12, 14, and 15. In House 11, four concrete benches were installed. There is now a total of 65 feet of concrete benching 3 feet 6 inches wide in House 11. The broken glass at Conservatory Ranges 1 and 2 and at the Propagating Houses was replaced by the painters.

The chimney of Power House 1 was extended to a height of 100 feet. In order to accomplish this we added 35 feet of brick work. At Power House 2, a 6-inch steam pump was replaced and the fire-box of boiler 7 was reconstructed.

The steam engineers repaired the heating systems of the Museum Building, Conservatory Ranges 1 and 2, the Propagating Houses, and the comfort stations.

GROUNDS

A two-rail fence, 1,052 feet long, was erected around the hill north of the Allerton Avenue Entrance, and another two-rail fence 595 feet long was built north of the Iris Garden Entrance. A one-rail fence 392 feet long was erected around the Lily Pond. The Pelham Parkway Entrance at the Iris Garden corner has been completed. On each side of the driveway two posts 36 inches by 15 feet two inches high were erected and on each side of the paths two posts 20 inches by 22 inches by 4 feet 4 inches were built. At each end of the cast-stone wall two posts 30 inches by 30 inches by 9 feet high were erected. A cast-stone wall 12 inches wide, 4 feet high and 32 feet long was laid, which connects the last-mentioned posts. Four posts 20 inches by

20 inches, by 8 feet high, and 125 feet of 6-foot iron fencing were used to connect the entrance with the Pelham Parkway fence. Twenty-five posts 20 inches by 20 inches, by 8 feet high, and 650 feet of an iron fence 6 feet high were used to connect the Southern Boulevard fence with the entrance.

A wire-mesh fence 1,170 feet long and 7 feet high, with a foundation 6 by 30 inches, has been erected around a considerable part of the nursery. About 600 feet of a base for this wire fence have been built.

Repairs were made to the cedar, one- and two-rail iron fencing throughout the grounds, and the maps and signs were repaired or replaced wherever necessary.

The Propagating Houses were supplied with fuel for four months from wood cut from dead or fallen trees. Nearly forty tons of hay were cut during the warm weather. Three new carts and a team of horses have been purchased.

From May until September about a dozen picnics a week visited the Garden, the parties including from 75 to 1,000 children each. These children attended the public, private, and Sunday schools of Greater New York, Long Island, New Jersey, and Connecticut, and were escorted to the picnic grounds of the Garden by our special guards, who are assigned to these grounds daily during the summer months.

During the past year four uniformed police officers were assigned to the Garden from ten in the morning until six in the evening. They were assisted by two officers in civilian clothes. On Sundays and holidays ten guards, selected from the gardeners and laborers, assisted the keepers in patroling the grounds. About 340 summonses were served by the police officers for violations of park ordinances. The offenders were arraigned in the magistrates' courts and were fined from one to twenty-five dollars each.

The number of visitors to the Garden has greatly increased this last year.

For twenty-four hours every day, special guards were assigned to the rose, gladiolus, and dahlia collections during the summer months.

Due to the watchfulness of our employees, very little damage has been done to the plantations throughout the grounds.

Respectfully submitted,

ARTHUR J. CORBETT,

Superintendent of Buildings and Grounds.

REPORT OF THE PALEOBOTANIST

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to report as follows upon paleobotanical and other matters that have received my attention during the year 1927.

My principal item of research was concerned with the fossil flora of Porto Rico. The study of the Tertiary flora of the Collazo shales was continued. Identifications and descriptions of species, based upon comparisons with the existing flora of the region as exemplified by herbarium specimens, were made, and the larger part of this work was completed. The mechanical work of arranging the manuscript and plates in the form and sequence desired remains to be done.

Attention was also given to studies of the lithological characters of the several different kinds of matrix in which the plant remains occur, in order to infer and to visualize, as far as possible, the ecological conditions that probably obtained in connection with the flora; and in this connection I am indebted to Professor H. N. Coryell and associates, of Columbia University, for the lithological analyses and for interpretations of the same.

Another series of Porto Rican fossil plant remains, from the vicinity of Aibonito, collected during your sojourn on the island in the early part of the year, was subjected to careful examination, and the results attained may be found listed in the record book under Lot No. 56 (Accession No. 24).

I also examined and reported upon a series of specimens of semi-lignitic woods and fruits, of Pleistocene age, from Cuba, collected by Mr. Barnum Brown of the American Museum of Natural History. These became the property of the Garden, in exchange for the examination and report, and may be found listed in the record book under Lot No. 57 (Accession No. 25).

An especially noteworthy accession to the paleobotanical collections was a shipment of forty-five specimens of Euro-

pean Mesozoic plants, containing forty-two identified species, from Professor Rudolf Florin of the State Museum at Stockholm, Sweden, sent in exchange for equivalent American material. These specimens may be found listed in the record book under Lot Nos. 47-55 (Accession No. 23).

Accessions of paleobotanical literature, received as exchanges, include thirty-nine separate publications, from fourteen foreign and eight American authors. Five of the authors represent new contributors. Incidentally, it may here be appropriate to note that one of the publications received was "Plants of the Past," a posthumous work by Frank Hall Knowlton, one of the few American paleobotanists, who died November 22, 1926.

During most of the summer I was engaged in bibliographic research, correspondence, and editing of manuscript, in connection with our joint revision of the flora of Staten Island.

Five days, and parts of other days when time was available, were spent in field work on Staten Island and elsewhere within the local flora range, and about fifty specimens, including forty-four species, were collected and added to the local herbarium.

I was in attendance at the Southern Museums Conference at Charleston, S. C., April 7-9; the annual meeting of the American Association of Museums at Washington, D. C., May 22-26; and the exercises held in connection with the dedication of the new botanical laboratory building at Wellesley College, Wellesley, Mass., November 3-5.

It was also my privilege to deliver a lecture in the regular Garden course, on February 26, on "Some geological features of The New York Botanical Garden."

Finally, it is satisfactory to report that our facilities for paleobotanical study in connection with the library and collections, and incidentally in connection with the herbarium, were recognized, and apparently appreciated, by a

number of investigators interested in fossil plants, as evidenced by correspondence received and by visits from students engaged in critical paleobotanical research.

Respectfully submitted,

ARTHUR HOLLICK,

Paleobotanist.

REPORT OF THE HONORARY CURATOR OF THE ECONOMIC COLLECTIONS FOR THE YEAR 1927

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to submit the following report of the Economic Collections, during the past year.

It is a pleasure to say that satisfactory progress has been made toward completing the labeling of the specimens in the Museum. In several previous reports, I have referred to the increasing number of specimens that were supplied only with the original record slips required for identification, and have urged the importance of supplying formal printed labels. The cost of printing single labels of this kind has been prohibitive, so far as our resources are concerned, so that my suggestions could not be followed. We have now resorted to the method of typewriting labels, in large type, on stiff paper. Although this must be regarded as merely a temporary expedient, it is regarded as an important step in rendering the specimens more intelligible and the Museum more educational.

Although the work is not completed, hundreds of labels have been prepared and are ready for distribution. The affixing of these individual labels will be followed by the preparation of group labels, of a more explanatory character.

As I have been closely occupied with the study of tropical American plants, especially with a large collection from Bolivia, collected by Mr. G. H. H. Tate, of the Ladew Expedition, this label work has been prepared by Mr. Alexander under the direction of Dr. Small.

A number of specimens, secured from time to time, have been installed during the year.

H. H. RUSBY,

Honorary Curator of the Economic Collections.

REPORT OF THE HONORARY CURATOR OF MOSSES

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Dear Sir: During the year 1927 some notable additions have been made to the moss collections. By the gift of Dr. George N. Best of his large private collection the Garden has acquired many interesting specimens, which are being mounted and accessioned, and so far total 1,578 packets. In addition, 2,095 specimens have been mounted. These include the regular exsiccatae distributed by Dr. Grout and by Professor Holzinger. Several large collections have been received from the National Herbarium in Washington, including Paul Standley's Costa Rica mosses, Dr. Maxon's from Jamaica, Brother Arsène's from Mexico and Louisiana, and Mr. Leonard's from Haiti.

Mr. Williams has devoted much time to the study of several large South American collections, and Mr. E. B. Bartram, with our assistance, to the Central American species. The Field Museum at Chicago has continued to send its collections from Peru; and accessions have been received from Venezuela and Colombia, collected by Pittier, Killip, and others. An interesting collection from the Galapagos Islands, made by Alban Stewart, was received from Miss Alice Eastwood. The museum of Rio de Janeiro, Brazil, has also sent specimens for study. Miscellaneous North American mosses have been added, notably from Kentucky, New Mexico, Louisiana, Wyoming, Utah, Alabama, and Florida. Few Canadian and Alaskan mosses have been received.

Mr. Williams has been very faithful in his devotion to the collections and has supervised the mounting and transferring of the whole moss herbarium during our absence in Porto Rico.

The death of Miss Olivia Phelps Stokes removes one of our honorary members of the Advisory Council. The generous gift by Miss Stokes and her sister in 1902 of a fund to be devoted to the protection and study of wild flowers, has enabled the Garden to give great help toward the conservation of our native flora. The demand for information,

lectures, and literature has become constant and widespread and has laid a broad foundation for the Garden Club of America, and the National Wild Flower Preservation Society to continue the work already started.

I have continued to supervise the care of the lantern-slide collection and wish to express our thanks to Mrs. Bodman and Mrs. Peckham for their interest and help. During the year 240 slides have been added, 219 of which were colored, and thirty-nine lectures have been given in which our slides were used. The demand from garden clubs and other associations for talks continues to increase and a large correspondence occupies much of our time. Requests for the loan of lantern-slides are frequently made and the accumulated interest of the Stokes Fund could not be used to a better purpose than the making of slides to meet such demands.

Respectfully submitted,

ELIZABETH G. BRITTON,

Honorary Curator of Mosses.

REPORT OF THE HONORARY CUSTODIAN OF THE LOCAL HERBARIUM

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: My report as Honorary Custodian of the Local Herbarium is necessarily brief for the year 1927.

I have been able to do only a little collecting in the vicinity, chiefly of species of Orchidaceae. Mrs. Mitchell, my efficient helper, has prepared the following statement of work done in the Herbarium:

Some distributing and sorting was done and during the summer each specimen from Staten Island was located and checked by the Staten Island list, according to the Director's instructions; a number were taken out for inspection and later redistributed.

The work carried on in the Bicknell Herbarium consisted largely of the sorting of the unmounted specimens of Salicaceae to Fabaceae inclusive and the laying out into sets and label-writing of the same. Seventy hours outside assistance during the summer completed the label-writing of the approximately twenty-five families, some small, some large, such as Brassicaceae and Rosaceae. There are now 8,545 sheets written in the Bicknell Herbarium.

The accessions for the Local Herbarium amount to 199 specimens.

H. M. DENSLOW,
Honorary Custodian of the Local Herbarium.

REPORT OF THE CHAIRMAN OF THE SCIENTIFIC DIRECTORS

TO THE BOARD OF MANAGERS OF THE NEW YORK BOTANICAL GARDEN.

Gentlemen: The Scientific Directors have held their regular meetings through the year, and have considered many matters relating to the adequate maintenance and further development of the Garden. The scientific and educational activities of the Garden are fully summarized in the report of the Director.

We especially regret to have to record the resignation of our colleague, Doctor F. S. Lee. Doctor Lee has always given freely of his time and has shown unbounded interest in the problems involved in the continued growth and improvement of the Garden. To his initiative and untiring efforts we owe the movement which led to the Olmsted Report and the plans under which the Garden has had over $1,000,000 added to its endowment.

The Scientific Directors have continued to give much time to the consideration of the problem of adequate protection of the plantations from plant diseases and insect pests. In common with all other public parks and gardens as well as the owners of estates with forests and decorative planting, the Garden is confronted with the necessity of continually increasing its efforts for protection against epidemic outbreaks of insect and fungous parasites.

With the growth of the city to and around the Garden we are also confronted with more insidious and physiologically dangerous atmospheric, soil and moisture conditions, control of which is yet largely to be worked out.

The New York Botanical Garden is well situated to take the lead in the study and solution of all these great problems, not only for our own metropolitan district but for city planting generally.

Respectfully submitted,

R. A. HARPER,

Chairman of the Scientific Directors.

TREASURER'S REPORT FOR THE YEAR ENDING DECEMBER 31, 1927

EXHIBIT I

BALANCE SHEET

December 31, 1927

JOHN L. MERRILL, *Treasurer*

ASSETS

Permanent Fund Assets:			
Investments (Exhibit III)		$2,261,947.79	
Cash awaiting investment		8,710.69	
			$2,270,658.48
Permanent fund assets expended for current uses (See current fund liability per contra)		44,592.01	
			$2,315,250.49
Current and Working Assets:			
Cash in banks and on hand:			
General purposes	$ 13,378.38		
Special purposes	17,105.28		
		$ 30,483.66	
Account receivable—City maintenance		17,464.11	
Interest and dividends receivable (Exhibit III)		30,447.77	
Prepaid insurance premiums		1,716.75	
			80,112.29
			$2,395.362.78

EXHIBIT I

BALANCE SHEET

December 31, 1927

LIABILITIES

Permanent Funds (Exhibit IV):		
Restricted endowments	$ 179,367.47	
Unrestricted endowments, including unconditional bequests set aside by the Board of Managers as permanent funds	2,118,411.82	
Special endowment, with life interest in respect of income therefrom	17,471.20	
		$2,315,250.49
Current Liabilities and Special Funds:		
Current liabilities:		
Accounts payable	$ 3,320.61	
Special funds (Exhibit V):		
Unexpended income from restricted funds	$ 5,071.16	
Unexpended contributions set aside by the Board of Managers for specific purposes	12,034.12	
		17,105.28
Deferred income credits:		
Membership dues paid in advance	$ 700.00	
Subscriptions paid in advance	215.00	
		915.00
Indebtedness to permanent funds for expenditures of fund assets for current uses		44,592.01
Surplus:		
Surplus at December 31, 1926	$ 9,301.67	
Add—Excess of income over expenditures for the year ending December 31, 1927 (Exhibit II)	4,877.72	
	14,179.39	
		80,112.29
		$2,395.362.78

PRICE, WATERHOUSE & CO.

CERTIFICATE OF AUDITORS

We have examined the books and accounts of The New York Botanical Garden for the year ending December 31, 1927, and certify that the attached balance sheet (Exhibit I) and relative statements (Exhibits II to V, inclusive) are correctly prepared therefrom, and, in our opinion, set forth fairly the financial position of the corporation as at December 31, 1927, and the transactions for the year ended on that date.

PRICE, WATERHOUSE & CO.

56 Pine Street, New York, March 20, 1928.

EXHIBIT II

Statement of Operations for the Year Ending December 31, 1927

	City maintenance	General	Restricted and special funds	Total
Income:				
Income from investments of permanent funds....		$106,423.96	$ 8,774.66	$115,198.62
Contributions	$230,000.00	5,996.17	10,865.41	246,861.58
Membership dues:				
Annual		15,340.00		15,340.00
Sustaining		475.00		475.00
Sales of duplicate books and sundries		316.50		316.50
Subscriptions and sales of publications		3,510.87	2,837.84	6,348.71
Total income	$230,000.00	$132,062.50	$22,477.91	$384,540.41
Expenses:				
Maintenance and general expenses:				
Salaries of Director-in-chief, assistants and Garden staff	$161,155.42	$52,555.60		$213,711.02
Wages	22,886.25	30,685.40		53,571.65
Materials and supplies..	45,958.33	4,497.93		50,456.26
Stationery, printing, postage, etc.		4,048.10		4,048.10
Interest and exchange..		372.95		372.95
Insurance		1,465.27		1,465.27
Miscellaneous		3,632.12		3,632.12
	$230,000.00	$97.257.37		$327,257.37
Improvements and exhibits:				
Improvements to buildings and grounds		$13,394.21	$ 4,885.41	$ 18,279.62
Museum equipment purchased		1,630.83		1,630.83
Library equipment purchased		456.00		456.00
Laboratory equipment purchased		1,975.43		1,975.43
Garden equipment purchased		2,339.00		2,339.00
Library books, bindings, etc.		1,435.10	2,500.00	3,935.10
Museum specimens			624.85	624.85
Plant purchases and expenses		78.00	907.89	985.89
Botanical exploration and collections		541.06		541.06
Model Garden prizes.....			200.00	200.00
		$21,849.63	$ 9,118.15	$ 30,967.78
Education and research:				
Public lectures and instruction		$ 1,660.50	$ 19.38	$ 1,679.88
Scholarships, prizes, etc..		150.00		150.00
Publications		5,759.40	5,525.89	11,285.29
Research		507.88		507.88
Investigation and preservation of native plants..			14.84	14.84
		$ 8,077.78	$ 5,560.11	$ 13,637.89
Total expenses	$230,000.00	$127,184.78	$14,678.26	$371,863.04
Excess of income over expenses for the year.....	—	$ 4,877.72	$ 7,799.65	$ 12,677.37

EXHIBIT III

Summary of Investments, December 31, 1927

	Par value (No par value stocks at book value)	Approximate market value	Book value	Accrued interest and dividends Dec. 31, 1927	Average yield for year on basis of book value
General funds:					
Bonds	$ 549,000.00	$ 554,140.00	$ 534,919.63	$ 7,243.95	4.92%
Stocks —					
Preferred ...	45,000.00	54,125.00	50,602.50	687.50	5.43
Common	14,700.00	21,756.00	17,091.67	220.50	5.16
	$ 608,700.00	$ 630,021.00	$ 602,613.80	$ 8,151.95	4.97%
Sage Fund:					5.43%
Bonds	$ 515,000.00	$ 518,641.25	$ 462,613.81	$ 9,041.24	
Stocks —					
Preferred ...	112,500.00	142,206.25	121,787.51	1,356.25	5.83
Common	72,200.00	183,326.50	93,762.50	1,805.00	7.78
	$ 699,700.00	$ 844,174.00	$ 678,163.82	$12,202.49	5.80%
Special Endowment and John D. Rockefeller, Jr., Funds:					
Bonds	$ 220,000.00	$ 226,843.75	$ 220,158.75	$ 2,708.33	5.00%
Stocks —					
Preferred ...	614,137.50	790,125.00	733,656.89	7,250.00	5.42
Common	9,000.00	11,160.00	9,900.00	135.00	5.44
	$ 843,137.50	$1,028,128.75	$ 963,715.64	$10,093.33	5.32%
Special Trust Fund:					
Common stock	$ 23,600.00	$ 34,928.00	$ 17,454.53	—	8.69%
	$2,175,137.50	$2,537,251.75	$2,261,947.79	$30,447.77	5.40%

Summary of Average Yields of Investments for Year

Bonds	5.11%
Stocks —	
Preferred	5.48
Common	7.41
	5.40%

EXHIBIT IV

Statement of Permanent Funds, Showing Changes During the Year Ending December 31, 1927

	Balance at Jan. 1, 1927	Additions	Transfers	Balance at Dec. 31, 1927
Restricted endowments:				
Endowment for science and education	$ 89,115.49			$ 89,115.49
Addison Brown Fund	21,149.31			21,149.31
John Innes Kane Fund	10,347.63	$ 25,000.00		35,347.63
Maria DeWitt Jesup Fund	25,000.00			25,000.00
Olivia E. and Caroline Phelps Stokes Fund	3,000.00			3,000.00
Charles Budd Robinson Fund	755.04			755.04
The H. H. Memorial Fund	5,000.00			5,000.00
	$ 154,367.47	$ 25,000.00		$ 179,367.47
Unrestricted endowments:				
Endowment Fund	$ 228,513.54	$ 929.52		$ 229,443.06
David Lydig Fund	34,337.86			34,337.86
Students' Research Fund	5,186.00	470.00		5,656.00
Wm. R. Sands Fund	10,000.00			10,000.00
Darius Ogden Mills Fund	48,099.17			48,099.17
Henry Iden Fund	10,000.00			10,000.00
Fanny Bridgham Fund	30,000.00			30,000.00
Francis Lynde Stetson Fund	25,000.00			25,000.00
Russell Sage and Margaret Olivia Sage Memorial Fund	723,832.39	1,180.00		725,012.39
Frances Griscom Parsons Fund	2,304.67			2,304.67
Endowment and Development Fund	565,951.00	397,221.33	$963,172.33	
Special Endowment Fund			463,172.33	463,172.33
The John D. Rockefeller, Jr., Fund			500,000.00	500,000.00
The Charles Patrick Daly and Maria Lydig Daly Fund	19,636.34			19,636.34
The James A. Scrymser and Mary C. Scrymser Fund		12,750.00		12,750.00
The George N. Best Fund		3,000.00		3,000.00
	$1,702,860.97	$415,550.85	—	$2,118,411.82
Special endowments:				
Special Trust Fund	$ 17,000.00	$ 471.20	$	$ 17,471.20
	$1,874,228.44	$441,022.05	—	$2,315,250.49

EXHIBIT V

Special Funds

Statement of Application of Income From Restricted Permanent Funds and Special Contributed Funds Designated for Specific Purposes

	Balance Jan. 1, 1927	Additions	Expenditures	Balance Dec. 31, 1927
Restricted permanent funds:				
Endowment for science and education:				
Public lectures and instruction, research and publications other than "Addisonia"	$ 869.04	$ 4,359.53	$ 3,653.43	**$ 1,575.14**
Addison Brown Fund:				
Publication of "Addisonia"		3,872.46	3,872.46	
John Innes Kane Fund:				
Plant purchases and expenses	518.58	1,729.21	907.89	1,339.90
Maria DeWitt Jesup Fund:				
Botanical collections ...	1,405.49	1,223.00	1,124.85	1,503.64
Olivia E. and Caroline Phelps Stokes Fund:				
Investigation and preservation of native plants	301.48	146.76	14.84	433.40
Charles Budd Robinson Fund:				
Exploration	2.00	36.94		38.94
The H. H. Memorial Fund:				
Development of model gardens	135.54	244.60	200.00	180.14
	$3,232.13	$11,612.50	$ 9,773.47	$ 5,071.16
Special Funds contributed for specific purposes:				
Contributions of Trustees of Carnegie Corporation for program of public education	$6,000.00	$ 6,000.00		$12,000.00
Contribution of F. K. Sturgis for construction of Iris Garden entrance		4,865.41	$ 4,865.41	
Contributions for Garden Club lectures	53.50		19.38	**34.12**
Helen C. Inslee bequest balance for construction of Linnaean Bridge entrance	20.00		20.00	
	$6,073.50	$10,865.41	$ 4,904.79	$12,034.12
	$9,305.63	$22,477.91	$14,678.26	$17,105.28

REPORT OF THE COMMITTEE ON PATRONS, FELLOWS AND MEMBERS FOR THE YEAR 1927

The number of new members who have qualified is 212. The number of annual members is now 1,643; life members 120; sustaining members 20.

Of the annual members 57 are now in arrears for dues for 1927, 33 for dues for 1926 and 1927, 24 for dues for 1925, 1926 and 1927.

Dues have been collected to the amount of $16,070.

Two persons have qualified as life members by the payment of $250 each. These sums have been transmitted to the treasurer.

A complete list of all classes of members to date is herewith submitted.

Benefactors

Edward D. Adams,
*Mrs. Fanny Bridgham,
*Hon. Addison Brown,
*Andrew Carnegie,
Columbia University,
*Hon. Charles P. Daly,
Daniel Guggenheim,
Murry Guggenheim,
Edward S. Harkness,
*Mrs. John Innes Kane,
*D. O. Mills,
J. P. Morgan,
*J. Pierpont Morgan, Sr.,
John D. Rockefeller,
John D. Rockefeller, Jr.,
*Mrs. Russell Sage,
*Francis Lynde Stetson,
*Cornelius Vanderbilt.

Patrons

Oakes Ames,
George F. Baker,
*Miss Catherine A. Bliss,
Dr. N. L. Britton,
*Hon. Addison Brown,
*Andrew Carnegie,
*Mrs. George Whitfield Collord,
*Mrs. Louisa Combe,
*James M. Constable,
*Charles Deering,
Henry W. de Forest,
Dr. Robert W. de Forest,
*William E. Dodge,
James B. Ford,
*George J. Gould,
Edward S. Harkness,
*Mrs. Esther Herrman,
Frederick Trevor Hill,

* Deceased.

Archer M. Huntington,
*Henry Iden,
*Mrs. Helen C. Inslee,
*Mrs. John Innes Kane,
*John Stewart Kennedy,
*Mrs. Mary J. Kingsland,
Prof. Frederic S. Lee,
Mrs. Frederic S. Lee,
*J. Pierpont Morgan, Sr.,
*Oswald Ottendorfer,
*Lowell M. Palmer,
*William Rockefeller,
*William R. Sands,
*William C. Schermerhorn,
Mortimer L. Schiff,
*James A. Scrymser,
*Mrs. Mary C. Scrymser,
Mrs. Finley J. Shepard,
*Samuel Sloan,
*Mrs. Frederick F. Thompson,
*W. K. Vanderbilt,
Mrs. Antoinette Eno Wood.

40

* Deceased.

Fellows for Life

Edward D. Adams,
J. E. Aldred,
George F. Baker,
Miss Elizabeth Billings,
Dr. N. L. Britton,
Mrs. N. L. Britton,
Mrs. Andrew Carnegie,
James W. Cromwell,
Mrs. W. Bayard Cutting,
Dr. Robert W. de Forest,
James B. Ford,
Childs Frick,
Daniel Guggenheim,
Murry Guggenheim,
S. R. Guggenheim,
William Halls, Jr.,
Mrs. William L. Harkness,
Mrs. John Stewart Kennedy,
Prof. Frederic S. Lee,
Mrs. Frederic S. Lee,
William J. Matheson,
Ogden Mills,
J. P. Morgan,
Mrs. Lewis R. Morris,
Mrs. George W. Perkins,
E. A. Richard,
Mrs. John A. Roebling,
Mortimer L. Schiff,
Leon Schinasi,
Mrs. Arthur H. Scribner,
Mrs. John T. Terry,
Charles G. Thompson,
Louis C. Tiffany,
Tiffany & Company,
Felix M. Warburg,
Mrs. William H. Woodin.

Life Members

Edward D. Adams,
Dr. Felix Adler,
Dr. S. T. Armstrong,
Edward W. C. Arnold,
Mrs. Hugh D. Auchincloss,
Dr. John Hendley Barnhart,
George A. Barron,
Aurel Batonyi,
Gustav Baumann,
Samuel R. Betts,

William G. Bibb,
Miss Elizabeth Billings,
Mrs. Robert Woods Bliss,
George Blumenthal,
G. T. Bonner,
Mrs. Addison Brown,
Mrs. Andrew Carnegie,
T. Morris Carnegie,
Miss Marian Roby Case,
Frank R. Chambers,
Hugh J. Chisholm,
Hugh J. Chisholm, Jr.,
George C. Clark,
Banyer Clarkson,
Dr. James B. Clemens,
William F. Cochran,
W. R. Coe,
William Colgate,
Miss Georgette T. A. Collier,
W. E. Conner
Mrs. F. A. Constable,
S. Wilbur Corman,
R. N. Cranford,
Melville C. Day,
Mrs. John Ross Delafield,
Maturin L. Delafield,
Rev. H. M. Denslow,
W. B. Dickerman,
Dr. George N. Miller,
Miss Josephine W. Drexel,
Isaac W. Drummond,
Miss Ethel DuBois,
William A. DuBois,
George E. Dunscombe,
Thomas Dwyer,
Ambrose K. Ely,
Dr. John F. Erdmann,

Edward J. Farrell,
Marshall Field,
Mrs. H. J. Fisher,
Charles R. Flint,
Eugene G. Foster,
Mrs. John French,
Childs Frick,
Daniel Guggenheim,
Bernard G. Gunther,
Franklin L. Gunther,
Charles J. Harrah,
R. Somers Hayes,
John Hubbard,
Archer M. Huntington,
Frank D. Hurtt,
James H. Hyde,
Mrs. Columbus O'D. Iselin,
Miss Annie B. Jennings,
Mrs. David J. Kelley,
Nathaniel T. Kidder,
W. B. Kunhardt,
Charles Lanier,
W. V. Lawrence,
Mrs. George Lewis,
Joseph Loth,
Louis Marshall,
Edgar L. Marston,
William J. Matheson,
C. W. McAlpin,
Dr. George N. Miller,
A. G. Mills,
Mrs. William F. Milton,
Dr. Lewis R. Morris,
Newbold Morris,
Sigmund Neustadt,
A. Lanfear Norrie,
Gordon Norrie,

George M. Olcott,
Mrs. Charles Tyler Olmstead,
William Church Osborn,
W. H. Perkins,
Curt C. Pfeiffer,
Gustavus A. Pfeiffer,
M. Taylor Pyne,
Miss Florence E. Quinlan,
John J. Riker,
J. C. Rodgers,
Thomas F. Ryan,
Mrs. Herbert L. Satterlee,
Dr. Reginald H. Sayre,
Edward C. Schaefer,
Mortimer L. Schiff,
Mrs. I. Blair Scribner,
George Sherman,
James Shewan,
Miss Marion Smith,
Dr. Nelson Smith,
James Speyer,
Miss Ellen J. Stone,
Albert Tag,
Paul G. Thebaud,
Charles G. Thompson,
Robert M. Thompson,
William Thorne,
Oswald W. Uhl,
Miss Anna Murray Vail,
F. T. Van Beuren,
Mrs. C. Vanderbilt,
F. M. Warburg,
John I. Waterbury,
S. D. Webb,
Dr. W. Seward Webb,
John D. Wing,
Mrs. Anna Woerishoffer.

Sustaining Members

Miss Elizabeth Billings,
Miss Mary T. Bryce,
John Greenough,
Mrs. E. V. C. Hawkes,
O. H. Kahn,
Mrs. Frida Merz Krollpfeiffer,
Edgar L. Marston,
George Grant Mason,
Arthur M. Mitchell,
William Church Osborn,
Mrs. Mabel Prell,
Edward Prizer,
Mrs. James T. Pyle,
Mrs. M. Taylor Pyne,
Mrs. Stanley Resor,
J. E. Spingarn,
Dr. Edward H. Squibb,
William R. Stewart,
Charles Strauss,
Arthur Hays Sulzberger.

Annual Members

Dr. Robert Abbe,
E. F. Abell,
Benjamin Abert,
Miss Elisabeth Achelis,
John Achelis,
C. E. Adams,
Mrs. Elbridge L. Adams,
F. B. Adams,
Henry S. Adams,
Maurice D. Adams,
Mrs. George B. Agnew,
J. E. Aldred,

Mrs. Richard Aldrich,
Spencer Wyman Aldrich,
Mrs. Winthrop W. Aldrich,
Mrs. W. H. Aldridge,
Sir Douglas Alexander, Bart.,
Mrs. John W. Alexander,
Mrs. Frederick Allen,
James F. Allen,
Philip Allen,
Dr. C. Ludwig Ambos,
Mrs. O. P. Amend,
Mrs. Alexander L. Anderson,
Mrs. Arthur M. Anderson,
P. Chauncey Anderson,
J. M. Andreini,
Miss Charlotte L. Andrews,
D. A. Ansbacher,
Mrs. John F. Archbold,
Francis J. Arend,
Reuben Arkush,
Mrs. H. O. Armour,
Benjamin Walworth Arnold,
Dr. William Aronstein,
B. M. Asch,
Mrs. M. Ascher,
Mrs. George H. Ashdown,
Mrs. Eugene Atwood,
Mrs. E. S. Auchincloss,
Mrs. E. S. Auchincloss, Jr.,
John W. Auchincloss,
Harmon Spencer August,
Chellis A. Austin,
Charles F. Ayer,
Frank L. Babbott,
Jules S. Bache,
Isaac D. Bachmann,
Mrs. T. L. Bailey,
Mrs. Earle Bailie,
Charles Baird,
Miss Charlotte S. Baker,
George F. Baker,
Mrs. George F. Baker, Jr.,
Stephen Baker,
Albert H. Baldwin,
George V. N. Baldwin, Jr.,
William D. Baldwin,
Ancell H. Ball,
Mrs. D. C. Ball,
Edward L. Ballard,
Louis Bamberger,
Mrs. Thomas H. Barber,
Percival M. Barker,
Mrs. John Hampton Barnes,
George P. Bartholomew,
Mrs. H. G. Bartol,
George de Forest Barton,
Mrs. Martha Battle,
Felice Bava,
Mrs. L. P. Bayne,
Jeremiah Beall,
John D. Beals,
Edward E. Bechtel,
Lewis Bechtold,
Miss M. Elizabeth Beers,
Frank Begrisch, Jr.,
Hernand Behn,
Mrs. A. Frederick Behre,
Dr. Otto F. Behrend,
Frank N. Bell,
Mrs. Louis V. Bell,
William B. Bell,
A. Beller,
Alex. Benecke,
Andre L. Benel,

Mrs. W. W. Benjamin,
J. Philip Benkard,
Bruno Benziger,
Mrs. Charles F. Berger,
E. R. T. Berggren,
Dr. Alice R. Bernheim,
Mrs. Henry J. Bernheim,
Isaac J. Bernheim,
Charles L. Bernheimer,
Dr. Israel I. Bernstein,
Milton L. Bernstein,
Philip Berolzheimer,
Edward J. Berwind,
Miss Ellen I. Betty,
Mrs. George Biddle,
Mrs. Sylvan Bier,
Nathan I. Bijur,
Samuel H. Bijur,
Edward Lyman Bill,
Raymond Bill,
C. K. G. Billings,
Richard Billings,
Cecil Billington,
Mrs. John F. Birch,
Mrs. Stephen Birch,
Miss Katherine H. Birchall,
Maynard S. Bird,
Mrs. Charles E. Birge,
James C. Bishop,
George H. Bissinger,
Mrs. Robert C. Black,
Mrs. Roger Derby Black,
Frederick S. Blackall,
H. C. Blackiston,
Mrs. Dexter Blagden,
Mrs. Emmons Blaine,
J. Insley Blair,

Isidore Blauner,
C. N. Bliss, Jr.,
Miss S. D. Bliss,
Mrs. Walter P. Bliss,
Delos A. Blodgett, 2nd,
Samuel Shipley Blood,
Lewis M. Bloomingdale,
Mrs. M. J. Bluen,
Dr. Richard Blum,
Hugo Blumenthal,
Sidney Blumenthal,
Mrs. Albert B. Boardman,
Bradford Boardman,
Miss R. C. Boardman,
Mrs. Edward C. Bodman,
Henry W. Boettger,
Robert Boettger,
Theodore Boettger,
Walter L. Bogert,
William H. Bolton,
Miss Rose Bondy,
Dr. Samuel Bookman,
Mrs. Howard S. Borden,
Mrs. Sydney C. Borg,
Louis Boury,
L. R. Bowden,
Miss Edith G. Bowdoin,
George T. Bowdoin,
Spotswood D. Bowers,
John Hall Bowman,
John McE. Bowman,
R. E. Boyd,
Mrs. Marius de Brabant,
Dr. Bernard Braveman,
Mrs. John C. Breckinridge,
Mrs. Jennie M. Breitenbach,
Mrs. Mollie F. Breitenbach,

George P. Brett,
Edward R. Brevoort,
George S. Brewster,
Hans V. Briesen,
Mrs. James E. Briggs,
John R. Brinley,
Mrs. Willard C. Brinton,
Jno. I. D. Bristol,
Miss H. Louise Britton,
Richard H. Britton,
Mrs. Harlow Brooks,
Thornhill Broome,
Ernest C. Brower,
Miss Aneita D. Brown,
Mrs. Archibald M. Brown,
Charles Hilton Brown,
Dickson Q. Brown,
Edwin H. Brown,
Franklin Q. Brown,
Mrs. Franklin Q. Brown,
Mrs. George McKesson Brown,
Mrs. Harold Brown,
Ronald K. Brown,
Mrs. Thatcher M. Brown,
Vernon C. Brown,
Warren D. Brown,
Mrs. J. Hull Browning,
Charles E. Bryant,
Miss Emily Buch,
Miss Anna J. Buechner,
Mrs. Jonathan Bulkley,
Dr. L. Duncan Bulkley,
Dr. C. V. R. Bumsted,
W. Douglas Burden,
Louis Burk,
Thomas Burkhard,
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VOL. 13 No. 50

BULLETIN

OF

THE NEW YORK BOTANICAL GARDEN

ISSUED MAY 31, 1929

CONTENTS

No. 50. MAY 31, 1929

REPORT OF THE SECRETARY AND DIRECTOR-IN-CHIEF FOR THE YEAR 1928 351

Report of the Head Curator of the Museums and Herbarium 355

Report of the Head Gardener 361

Report of the Honorary Curator of Iris and Narcissus Collections, 1928 364

Report of the Director of the Laboratories for the Year 1928 368

Report of the Plant Pathologist 373

Report of the Supervisor of Public Education 376

Report of the Bibliographer 379

Report of the Librarian 380

Report of the Paleobotanist 382

Report of the Superintendent of Buildings and Grounds 385

Report of the Honorary Curator of the Economic Collections 388

Report of the Honorary Curator of Mosses 389

Report of the Honorary Custodian of the Local Herbarium 391

REPORT OF THE CHAIRMAN OF THE SCIENTIFIC DIRECTORS ... 392

REPORT OF THE TREASURER 394

CERTIFICATE OF AUDITORS 395

REPORT OF THE COMMITTEE ON PATRONS, FELLOWS, AND MEMBERS FOR THE YEAR 1928 400

BULLETIN
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The New York Botanical Garden

Vol. 13 No. 50

REPORT OF THE SECRETARY AND DIRECTOR-IN-CHIEF FOR THE YEAR 1928

(*Accepted and ordered printed January* 14, 1929)

TO THE BOARD OF MANAGERS OF THE NEW YORK BOTANICAL GARDEN.

Gentlemen: Progress has been made during the past year in path-construction, grading, and drainage; in the expansion of the plantations; in repairs to buildings; in the increase of the collections of plants, books, lantern-slides, and specimens; in improved and increased floral displays; in the more complete organization of public education and the distribution of information; and in research and publication by members of the staff and by students.

Path-construction, with accompanying necessary grading and drainage, was prosecuted in the undeveloped part of the grounds between the southern end of the Hemlock Grove and Pelham Avenue; about 3,000 lineal feet of Telford path, ten feet wide, surfaced with coal ashes, were completed; railings were obtained for parts of these paths and are being set up during the winter; this development will operate to restrict trampling and diminish danger of damage to these fine natural woodlands. It is very desirable that path-building and railing be continued the next season in several parts of the reservation.

Work in earth-filling of the former lake at the long valley in the southeastern part of the grounds, suggested for a Rhododendron Glade, made necessary by the blockage of a drainage culvert, has been continued and approximates completion; through a Park Department contract, awarded

by Commissioner Hennessy, a sewer-connection was built during the summer at the southern end of this valley, providing a new drainage level about eight feet higher than the old one, the least that could be had in connecting with the only sewer available in Bronx Park East; it will now be possible to determine surface grades for this valley, and a plan for its planting and paths. A large amount of top-soil will ultimately be required, as well as much leaf-mould and some fertilizers; we have collected and stacked leaves this autumn in larger quantities than ever before, looking ahead to this need. Large expenditure for plants will also be necessary.

All existing plantations have been maintained, modified by additions and substitutions, and floral displays have been largely increased. A fourth model garden was built and planted, based on a plan obtained in competition through income of the H. H. Memorial Fund. Considerable expansion of the rock garden collection was effected. Through critical pathological attention, by repeated spraying, the rose garden was improved, and similar work on the cherry collection will, it is expected, increase its flowering; great success was had with water-lilies, both tender and hardy; the Dahlia display was good, but we shared in the general experience of this part of the country in having a relatively poor season for Dahlias; the Gladiolus collections were greatly increased and flowered profusely; the tulip displays, through continued coöperation of the Dutch Bulb-Growers' Association, maintained their accustomed elegance; coöperation with the American Iris Society continued the fine displays of irises; both hardy and tender chrysanthemums provided attractive autumn displays; plantations of daffodils were considerably extended, and through funds mostly obtained through subscriptions, about 88,500 bulbs of crocuses, squills, and Chionodoxa were purchased, and planted on Pinetum hillsides near the southeastern end of Conservatory Range No. 1.

Some preliminary work in preparing land for a new herbaceous flower-garden at the eastern end of Conserva-

tory Range No. 1, and in planting there, was accomplished during the autumn. The whole Pinetum was checked up and largely recatalogued and relabeled, showing about 250 kinds of coniferous trees and shrubs in this collection, and also indicating desiderata for its more complete installation.

Police protection has not been increased; the rapid building up of the area east of Bronx Park, with greatly increased population, and continuously more and more usage of the reservation from this direction and others, is rapidly making more surveillance necessary to ensure the safety of plantations, buildings, and natural features. It is already desirable that the number of keepers and of night watchmen employed should be considerably enlarged, as police supervision cannot be depended upon.

Public education and information were reorganized and expanded through the appointment at the middle of the year of a Supervisor of Public Education, and one assistant was later provided for him, and additions were made to appropriations for lectures and educational materials. His duties were assigned to include arrangements for public lectures at the Garden and lectures elsewhere to garden clubs, schools, and other organizations; the care and increase of the collection of lantern-slides; oversight of docentry and photography; participation in publicity, which has been widely expanded, and in giving out information to visitors and by letters.

To provide for more complete development of public education, additional assistants are needed, especially for docentry, which is as yet being given by employees whose duties are primarily along other lines of usefulness and for which their full time is required.

Museum and herbarium collections have been improved by study and classification, and additions of many desirable specimens have been made, principally by exchanges of duplicates with other institutions. Through purchases and exchanges the library has been increased by about 1,400 bound volumes and very many pamphlets; the number of bound volumes is now about 38,500; the card catalogue has

been posted nearly up to date. All the serial publications have been continued.

The maintenance and development of the Garden have been effected in close coöperation with the Commissioner of Parks, Borough of The Bronx, and his staff; the city appropriation for maintenance was increased and recommendations of the Commissioner for improvements and developments have been transmitted by him to the Board of Estimate and Apportionment.

The reports of members of the staff, hereto appended, present detailed accounts of operations, administrative, educational, financial, and scientific.

N. L. BRITTON,
Secretary and Director-in-Chief.

REPORT OF THE HEAD CURATOR OF THE MUSEUMS AND HERBARIUM

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I submit herewith my report as Head Curator of the Museums and Herbarium for the calendar year 1928:

The collections and exhibits under my supervision were conserved by the same methods and developed through the same channels as in preceding years.

Through the agencies of

Gifts and purchases	10,951
Exchanges	11,412
Exploration	11,476
A total of	33,839

specimens was added to the resources of the Garden.

Collections totaling 5,635 duplicate specimens were sent to other institutions in exchange for other specimens.

The specimens accessioned came from a wide geographic range. Small but valuable series were received from the Old World, Europe, Asia, Africa, and Australia being represented. The New World contributed the great bulk of the additions, especially those regions whose floras and floristics the Garden is actively engaged in interpreting. Consequently, the former plant representations of several states of the United States, Mexico, Central America, West Indies, and northern South America were strongly augmented.

MUSEUMS

The six units comprising the public museums—the fossil-plant museum, the economic museum, the synoptic collection, microscope exhibit, plant-picture collection, and local-flora exhibit of the systematic museum—were improved by specimens interpolated and renovated. The additions made to the economic collections were mostly derived from explo-

ration and from economic plants grown in the garden plantations.

The fossil-plant museum was under the supervision of Dr. Arthur Hollick, Paleobotanist. (For details see his report.)

The development of the economic museum was under the supervision of Dr. H. H. Rusby, Honorary Curator of the Economic Collections. (For details see his report.)

HERBARIA

Specimens incorporated in the permanent herbaria were derived from current accessions and from the accumulation of stored materials received in former years.

A total of 15,360 herbarium sheets, carrying about 19,000 specimens, were added to the permanent collections. Most of the material mounted came from continental North America, the West Indies, and northern South America.

A limited number of specimens received for the Columbia University herbarium were mounted and incorporated in that collection.

Two collections of a special character were:

I. The moss herbarium, which was under the supervision of Mrs. N. L. Britton, Honorary Curator of Mosses. (For details see her report.)

II. The local flora herbarium, which was under the supervision of Dr. H. M. Denslow, Honorary Curator of the Local Flora Herbarium. (For details see his report.)

INVESTIGATION AND COÖPERATION

Dr. P. A. Rydberg, Curator, was in charge of the flowering-plant herbarium. Besides the usual routine in sorting and distributing herbarium specimens, determining plant-material, and answering inquiries, he began to verify and revise the determinations in the herbarium material of the Rocky Mountains, the Great Plains, and prairies west of the Mississippi River. His taxonomic work during the year has been divided between two families: Fabaceae and Por-

tulacaceae. In the former, he has revised the manuscript of *Astragalus* and related genera and enough for one part of the North American Flora is in the hands of the printers. The manuscript of another part and a half is ready, and the remaining half, comprising the genus *Oxytropis,* is well under way. In connection with this work he has also published preliminary papers in the *Bulletin of the Torrey Botanical Club,* under the title: "Notes on Fabaceae—X & —XI" treating the genus *Atelophragma.* Two more papers are in the hands of the editor. Two illustrated papers on the same family, prepared in 1927, entitled "Genera of North American Fabaceae—III & IV—Psoraleae" appeared in the early part of the year in *The American Journal of Botany,* with 5 plates, illustrating 20 genera. Number V of the same series, the first of three papers with the subtitle "Astragalus and Related Genera," is going through the press. The monographing of the family Portulacaceae was undertaken in conjunction with Mr. Percy Wilson, who has been preparing the manuscript for the genera *Portulaca, Talinum,* and *Talinopsis.* The rest of the family is treated by Dr. Rydberg and this part is about half ready.

Dr. H. A. Gleason, Curator, devoted his main energies to the care and development of our collections from northern South America. Our most important accessions during the period have been several hundred plants from Venezuela, over five hundred from Mount Roraima, and over six thousand from Colombia, all of which have been prepared for the herbarium and distributed under his supervision, while large numbers of these and of earlier collections have been identified by him personally. His chief scientific activities while in residence have been the study and revision of our northern South American material of the genera *Maripa* and *Hypericum,* of certain groups in the Melastomataceae, and of the Tate collection from Mount Roraima. This work has included the detection and description of numerous hitherto undescribed species, which have either been published or are awaiting publication at the present time. Dr. Gleason spent about six months in Europe, where he de-

voted the time to the preparation of manuscript for the proposed Flora of British Guiana, undertaken by the Garden in coöperation with the Royal Botanic Gardens at Kew. During this time abroad the manuscript for the Monocotyledons was completed, with the exception of four families assigned to specialists and one upon which work was postponed. In addition to his regular duties he delivered two of our public lectures and assisted several times with the instruction of visiting classes of high-school students.

Dr. Fred J. Seaver, Curator, continued in charge of the routine work connected with the mycological collections. A part of his studies on the Discomycetes has been published in the form of an illustrated manual consisting of 284 pages of text and 46 plates, two of which are in color. The text of this work will later be incorporated in North American Flora. He is continuing his research work on other groups of the Discomycetes, which will be treated in the same manner. He also continued to edit Mycologia, the volume for the year comprising 364 pages of text, including a number of research papers contributed by the editor. In connection with insect control, the new spray apparatus was put into action during the winter and an especial effort made to control, by dormant spray, the scale insects on various trees and shrubs, including the Japanese cherries. This resulted in about a 90% control. An effort was also made to supplement artificial control by the introduction of the natural enemy of the scale. On the first of May all insect control work was turned over to the newly appointed Plant Pathologist. The usual lectures were given in connection with the Saturday afternoon courses and in the spring Dr. Seaver took charge of the Garden's exhibit at the Parents' Exposition in the Grand Central Palace from April 21 to April 28.

Mr. Percy Wilson, Associate Curator, gave considerable attention to the study and determination of West Indian plants, especially those from the Island of Cuba. He has also studied and named large collections from northern South America. A considerable number of dissections and

slides have been made of plants representing the various genera in the family Mimosaceae. His work as docent has continued as in former years.

Mrs. William Mitchell, Associate Curator, devoted her attention to the better arrangement of the specimens of all the Gymnosperms and to the renovation of the specimens of about twenty plant-families, and also to the installing of various convenient labeling devices. She also attended to the recording of the specimens of certain collections and to the sorting and distribution of specimens both in the general herbarium and the local flora herbarium. Mrs. Mitchell prepared the specimens of many plant-families of the Bicknell herbarium and other local collections for incorporation in the herbarium and for exchanges. She also made translations into English of articles and letters from European countries.

The undersigned, in addition to curatorial details and routine, devoted all the available time to botanical investigations, some of which are referred to in the following items; (a) studies in the living collections of *Iris, Hymenocallis,* and miscellaneous plants brought together in the plantations during former explorations and through several correspondents in the southern states; many of these specimens flowered and were painted by Miss Eaton, artist, as subjects for future illustration in *Addisionia;* (b) developing two outdoor duplicate plantings, with the assistance of Mrs. Wheeler H. Peckham, Honorary Curator of the Iris and Narcissus Collections, of the iris plants from the southern States; (c) an intensive study of the flora and plant-geography of the southeastern States and the continuation of the taxonomic and geographic interpretation of the vegetation begun several years ago; (d) through the coöperation of Mrs. Arthur Curtiss James, two exploration trips were made to Florida, where studies were continued in the field, both in peninsular and northern Florida. However, a large part of the time was devoted to coöperation with Mr. Thomas A. Edison in his rubber studies at Fort Myers and other points. Information resulting from former field-

work and from some of the activities enumerated above, furnished material for eighteen articles which were printed during the year.

Respectfully submitted,

JOHN K. SMALL,

Head Curator of the Museums and Herbarium.

REPORT OF THE HEAD GARDENER

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to submit my annual report for the year 1928.

HORTICULTURAL OPERATIONS

The outside force of 13 gardeners under the direction of Mr. John Finley, Foreman Gardener, in addition to maintenance work in grounds, gardens, and hemlock forest, carried out several extensive plantings. Trees and shrubs were added to the grounds during both spring and fall planting seasons, including more than 80 new species and varieties added to the collections; many for street and path decorations or woodland and thicket groups in newly opened sections, and as decorative flowering groups such as the flowering crabs and hawthorns which were planted near the Iris Garden Entrance, these plants the gift of Mr. Samuel Moffitt. The daffodil naturalization scheme was extended, the new planting of crocus, scilla and other small bulbs effected, and the maintenance and changes in the iris garden carried out under the direction of Mrs. Wheeler H. Peckham. The extensive gladiolus collections of Dr. Forman T. McLean were planted, another large assortment of tulips, gift from the Holland Bulb-Exporters' Association, was put in place, the 1928 Prize Garden begun, and the usual plantings and replacements around the conservatories were made.

Dr. Southwick has completely rebuilt a great portion of the southeast side of the rock garden, and replanted much of the rest, using new plants, many of which he has raised from seeds or cuttings. The Rose Garden was very generously replanted again by Bobbink & Atkins, under the personal direction of Mr. Peter Kooy.

GREENHOUSE OPERATIONS

The greenhouse force of 17 gardeners, under direction of Mr. H. W. Becker, Foreman Gardener, maintained the con-

servatories as usual. A portion of House No. 6, Range No. 1, was emptied of plants, and the space devoted to the Mojave Desert exhibit shown by Mrs. Sherman Hoyt of Pasadena at the 1928 International Flower Show, and afterwards given by Mrs. Hoyt to the Garden. This exhibit was brought here and placed in House No. 6 in remarkable time and fashion, under Mr. Becker's direction. During repairs on Houses 9 and 10, at Range No. 1, the plants in these houses were placed in other houses and in the tender water-lily tank; they were returned later after complete renovation, resoiling, and retubbing, thus making houses and plants as good as new. Plants in all other houses and ranges were rearranged, repotted, pruned, and otherwise cared for. Flowering plants for the Central Display House, Range No. 2, were raised, among them 158 varieties of Chrysanthemums, including 50 new varieties given to the Garden by Mr. Elmer D. Smith of Adrian, Michigan.

SUMMARY FROM ANNUAL REPORT

Accessions:

Plants received	5,648
Bulbs "	143,850
Seeds (packets) received	1,054, including 100 collected by members of this Department.

Collections:

Conservatories	26,531	plants	
Arboretum and Fruticetum		"	
Pinetum	2,960	"	234 species
Herbaceous Collections			4,000 "

Displays:	*Plants*	*Varieties*
Tulips	68,750	160
Narcissus	200,000	150
Iris		1,200
Peony	503	240
Rose	5,000	280
Dahlia	1,000	350
Chrysanthemum	570	158

Displays:	*Plants*	*Varieties*
Cannas	1,060	64
Lilac	560	85
Mallow	560	
Variegated Plants	510	68
Dwarf Plantation	66	28
Fall-flowering Shrubs	85	11
Gladiolus	4,000	400
Rock Gardens	5,150	

Planting Additions:

Crocus, Scilla, etc.	3,000		
" (Naturalized)	83,500		
Lilies	100	bulbs	
Arboretum and Fruticetum	456	plants	
Pinetum	20	"	
Fruticetum Decorative	50	"	
1928 Prize Garden			
Conservatory Beds	250	"	
Conservatory Beds	75	"	of *Hemerocallis* from Dr. Stout
West Border	100	"	
Road and Paths	50	"	
Morphological Garden	25	"	

We have been almost continuously throughout the year engaged in supplying exchange collections to other institutions and schools, and furnishing materials for classwork.

I have given five lectures in the regular courses at the Garden. The following labels have been put in place and specimens collected.

Labels	3,570
Specimens	150

We are greatly indebted to Mr. Percy Wilson for relabeling the Rock Garden and to Mr. E. H. Fulling for recataloging and relabeling the Pinetum.

Respectfully submitted,

KENNETH R. BOYNTON,
Head Gardener.

REPORT OF THE HONORARY CURATOR, IRIS AND NARCISSUS COLLECTIONS, 1928

IRIS

The large collections of Irises made by Dr. Small in Florida and the Mississippi delta and planted in the Nursery in the late spring of 1927, gave a wealth of bloom this last summer. The plants had made a considerable growth during the autumn, and, not feeling willing to lose the whole of the "upperworks," we decided to give some protection over winter. This was done by placing boards on edge each side of, and along the rows. With a roof of maple branches and a thin sprinkling of hay, our plants came through quite well. Dr. Small and Mr. Alexander were thus able to describe many of the plants, putting on record some gorgeous new things that should have good garden value. Among these are a pale, ashen-mauve form of *Iris violipurpurea,* worthy of a name and a place in any flower-border; a very tall, light sky-blue, with immense flowers; a deep, red-purple; and a handsome white. The already described *I. vinicolor* showed up as a rival for anything that is in commerce among the Beardless Irises at the present time. Dr. Stout used these plants for hybridizing, making unusual crosses which should aid very materially in the study of this genus being carried out under the auspices of the American Iris Society. As many seedlings result from these crosses, ground to grow them is needed. It would be a pity to have to discard some certain "families" now started before it can be noted how their great-grandchildren will behave.

In the Bearded-Iris Garden we suffered from inroads of the so-called "root-rot" disease and have lost a great many plants. Dr. Dodge is working on this problem and two beds have been sterilized, the soil treated, healthy stock being planted there to determine the effect of "winter killing" as compared with the plants in beds that have received no care. Some drastic treatment will have to be given to the large beds which are badly affected and the plan for this will be

worked out by Dr. Dodge and his suggestions carried out throughout the year. It seems certain that we shall have to clear these beds and take out the soil, giving entirely new soil with fertilizer and every attention to make what we have in the way of plants survive.

The Alphabetical Garden was completely gone over and replanted, the divisions of plants being sent to many test and display gardens, some going a long distance, even to the University of Saskatchewan at Saskatoon, Canada, and others to Ames, Iowa, the Missouri Botanical Garden, Cornell University, Morton Arboretum, Yale University, Harvard University; McPherson, Kansas; Redding, Connecticut; Staten Island; Forest Park, Springfield, Massachusetts; Trenton Park Department, Trenton, New Jersey; the University of Minnesota, etc.

The plants in the Trial plot at the nursery were judged, dug, and distributed, or returned to the originators. Some were destroyed in accordance with the policy of the American Iris Society to try to raise the standard of these plants as used by the horticultural world.

Among gifts of plants this year we received a large collection of Japanese varieties (two hundred and fifty plants in fifty varieties) from John Lewis Childs, Inc., of Flowerfield, Long Island. Two new beds were made for these and two old beds were emptied of their occupants, some Siberian Irises that had not been doing well in that location, so we now have four beds of good Japanese Irises which we are fairly certain are correctly named and which we know to be the best to be had in this country. This was a handsome gift and one the visitors to the Garden will be sure to welcome.

The Sibirica varieties were put in a slightly damper position, which will probably suit them much better, and they took the place of some miffed creatures from Florida that had not enjoyed wet feet during winter. It seems certain that southern swamp plants cannot be placed in swampy locations in this locality if they are to persist. The actual cold, no doubt, is less harmful than ice about their roots and

alternate freezing and thawing. Early springs with late frosts are an added handicap.

Many other plants were received and a list of the donors follows:

DONORS OF IRISES, 1928

Edgar Anderson
W. A. Anderson, Jr.
Dr. W. McL. Ayres
J. H. Bratt
John Lewis Childs, Inc.
Mrs. Louise K. Clabough
L. J. Egelberg
Farr Nursery Co.
Thos. M. Fendall
Miss Louise Given
Gray & Cole
J. H. Grinter
Mrs. A. B. Hamilton
A. A. Heller
A. M. Hudelson
Dr. Nancy Jenison
Talbot D. Jones
E. G. Lapham
Longfield Iris Farm
Bruce C. Maples
A. C. Moore
Mrs. E. J. O'Connor
Aug. J. Pauls
Mrs. W. H. Peckham
Mrs. W. A. Plecker
C. A. Raynal
Mr. Read
Dr. P. A. Rydberg
Mrs. Arthur H. Scott
Mrs. Eleanor Sherewood
J. Marion Shull
W. N. Suksdorf
Mrs. Sara Toedt
University of Tennessee
Robert Wayman
Howard Weed
Dr. E. T. Wherry
J. C. Wister
Brother Wolf

NARCISSI

There is not much to report in this connection except that there were more flowers than ever. The normal increase took place and having so many, we thinned them here and there to get a supply to continue our planting down the path from the Alphabetical Iris Garden to the Iris Garden entrance. We also planted the bank facing Fordham Hospital to give the patients and staff a more attractive vista in springtime.

It was noted that the bicolor trumpet variety, Victoria, which is growing in a position shaded during a very small

part of the day, had few flowers and the rainy summer before with late frosts this last spring is blamed. The flower-buds were probably not well developed and what were in the bulbs may have been frozen after pushing up too early. As there has been a very wet season this year also, it will be interesting to see, if the coming spring is normal, whether these plants will behave in the same manner or return to what should be their normal behavior. Other years this particular spot has been very floriferous and the lack of flowers could not be caused by crowding, as the plot has been judiciously thinned.

Thousands of people visited the collection during the blooming season and with a very few exceptions they behaved well and respected the plants.

Respectfully submitted,

ETHEL ANSON S. PECKHAM,

Honorary Curator, Iris and Narcissus Collections

REPORT OF THE DIRECTOR OF THE LABORATORIES FOR THE YEAR 1928

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I submit herewith my annual report for the year 1928.

THE LABORATORIES

Early in the year all the microscopes belonging to the Garden (except the exhibition microscopes) were cleaned and repaired and a new microscope and two cameras were purchased. Later, to meet the needs for work in pathology, there were purchased two microscopes, an autoclave, a refrigerator, and a photomicrographic apparatus. We now need, as soon as the purchase can be made, a new water still and several lenses and oculars. For maintenance and general supplies during 1929 some expenditure above that of 1928 is logical on account of the increase in laboratory work.

COÖPERATION IN THE LILY-DISEASE INVESTIGATION

The coöperation in the investigation of lily diseases, outlined in my report for 1927, has been continued throughout the year with very gratifying results. The scholarship established for this research will be continued under the present plan until next autumn, when a complete report of the results will be published.

Bulbs of various of the more hardy lilies are being supplied by Mr. John T. Scheepers for planting in our grounds. Special effort will be made to keep these plantings free from disease in order to maintain a good public display of lilies in the border plantings.

COÖPERATION WITH THE AMERICAN IRIS SOCIETY

The scholarship awarded by The American Iris Society for this year was granted to Miss Katie Kirkpatrick, and her efforts were directed to further breeding work along lines desired by the Society. Her report has been submitted to The American Iris Society.

A report of the work of 1927 has been published*. The Iris seedlings grown from the seed obtained in 1926 bloomed during the year; a few of the best ones were selected for special study; some were planted in display beds; and all that were judged of no special value were discarded. The seedlings from the breeding work of 1927 have thrived and most of these will probably flower next year.

INVESTIGATIONS WITH POPLARS

The hybrids (about 13,000) obtained in the breeding work with species of *Populus* are now being grown in Maine and the selected seedlings are being propagated in a nursery established and maintained by The Oxford Paper Company. Various problems involved in the work, such as the taxonomy and the pathology, are being studied in our laboratories by Mr. E. J. Schreiner as a registered student of the Garden.

PERSONAL RESEARCH

My personal investigations continue to be directed chiefly to problems of sterility and fertility and to a few projects in breeding that may be combined with the studies of sterility and which have naturally developed in connection with them.

Studies with Hemerocallis. Work with the daylilies has become my major effort. This genus is being utilized very fully (1) for critical studies of all the species, (2) for studies of all the species and varieties as to their horticultural values, (3) for cytological studies with reference to sterility, (4) for experimental studies of sterilities, and (5) for breeding to produce new types of horticultural merit. The genus is not a large one but I know of no group of plants that affords better material or promises greater

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* Report of 1927 iris breeding experiment at The New York Botanical Garden, by Clyde Chandler and A. B. Stout. Bulletin of The American Iris Society No. 27, pp. 31-49. Contribution from The New York Botanical Garden No. 299.

returns of scientific and horticultural interest along the lines indicated above.

Several seedlings of outstanding merit have been obtained. A new species that produces as many as seventy-five to one hundred flowers per scape has been discovered among wild plants obtained from China, and a new race of H. *fulva* has been found that has flowers of light red and almost pink shades of color. From the latter, a red-flowered plant of remarkable beauty and richness of color has been obtained by selective breeding. I wish to use these new types in further breeding in the effort to develop still finer daylilies.

Cytological Studies. During the year special cytological studies have been made in reference to sterility and to fertilization. Pollen-tube behavior in several cases of self- and cross-incompatibility has been determined. A report on the irregularities in chromosome number in plants of the cultivated clon of *H. fulva* is now in manuscript ready for publication. This particular study is being extended to all the species of *Hemerocallis* and to numerous of the hybrids.

Research in Coöperation with the New York Agricultural Experiment Station. The main effort in this coöperation is for the breeding of hardy seedless grapes. The one seedling of high merit already obtained has continued to thrive, and it is being propagated for distribution and general trial. Several hundred seedlings of this breeding effort are yet to come to fruiting age. The pollinations made in 1928 were highly successful and gave over 2,000 seeds to crosses in which pollens of seedless grapes were used. A few vines of tender *vinifera* seedless grapes (Sultanina, Sultanina Rose, Black Corinth, and Black Monukka) are being grown in the court areas between greenhouses at Range No. 2. Some of these plants have bloomed fairly well and early enough to supply pollen for use at Geneva. The progress of this project warrants further effort and coöperation.

During the season of the blooming of the fruit crops, I spent a week at Geneva in continuing studies of the botanical and technical phases of the pollination requirements of

the important fruits. It is now planned to prepare a bulletin on these studies for publication. At least another season of coöperation in this particular project is desirable.

The Transmission of the Infectious Variegation of Abutilons through Seed. In connection with certain studies of the incompatibilities in fertilization among Abutilons, it has been determined that this virus disease may be transmitted to as many as one-third of the seedlings. But the point of special interest is that the variegation of the seedlings is paler and somewhat less pronounced than that of the parent type, a result which suggests that the virus may be weakened by passing through the seed or that different plants respond differently to the virus.

Experiments with Convallaria. It has now been fully determined that sterility from self-incompatibility is operating in various types of Lily of the Valley. Seed has been obtained to compatible crosses and methods of successful germination of the seed have been determined. Seedlings are now being grown in the attempt to improve and intensify the color of the pink-flowered type.

REGISTERED STUDENTS AND SCHOLARS

During the year, the following persons have been enrolled at the Garden, either as recipients of scholarships or as students registered for degrees:

ANDERSON, (MRS.) GLADYS POMEROY, Morphology of Algae.
BONISTEEL, WILLIAM JOHN, Plant Breeding.
BOWERS, CLEMENT GRAY, Breeding of Rhododendrons and Azaleas.
FAY, DOLORES JOAN, Plant Breeding.
GOODLATTE, AMELIA R., Plant Breeding.
JOHANSEN, DONALD ALEXANDER, Cytology of the Onagraceae.
KIRKPATRICK, KATIE CLEO, Breeding of Irises.
ORTON, OLIVER SMALL, Breeding of *Hemerocallis*.
ROBERTS, CHARLES M., Taxonomy of Mosses.
KEUR, JOHN YAK, Research with Abutilons.
ROMANOFF, HERBERT M., Taxonomy.

SCHREINER, ERNST J., Breeding, Pathology, and Taxonomy of *Populus*.

VARRELMAN, FERDINAND ARMIN, Chromoplasts of *Cuscuta*.

Respectfully submitted,

A. B. STOUT,
Director of the Laboratories.

REPORT OF THE PLANT PATHOLOGIST

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to submit herewith my annual report for the year 1928.

Owing to the hearty coöperation extended by Mr. Kenneth R. Boynton, Mr. John Finley and others, the routine work of combating such insect pests as have made their appearance in the Garden has been carried out without particular effort on my part.

It may be pointed out that a species of beetle, *Trirhabda vittata* on *Baccharis*, a snout beetle, *Prionomerus calceatus* on sassafras, and a flea beetle, *Chaetocnema quadricollis* on *Hibiscus*, not noted heretofore as doing particular damage to these plants in this vicinity, were rather numerous this year. The European willow-beetle also required special attention. The appearance of these four beetles another year will be anticipated and control measures applied at an earlier date.

A shot-hole leaf-spot disease of Japanese cherry, apparently caused by *Bacterium Pruni*, developed on several trees during the summer. This disease has not been reported on Japanese cherries and to what extent it may become in time a menace to these ornamentals is uncertain. In any event a promising method of control has just been reported for the same disease on the common peach.

About 10% of the scale insect, *Aulacaspis pentagona*, on the Japanese cherries survived the winter in spite of the three applications of commercial lime-sulphur, applied as dormant sprays. Two broods were hatched out during the summer. The first hatch occurred about June 10. The trees were sprayed June 17 with a solution of nicotine sulphate and soap, with very satisfactory results. The few insects that survived or hatched out later gave rise to a second brood during the first weeks in August. It was thought they were not more numerous than was desired to serve as hosts for certain parasites, which, it was hoped, would become established.

The irises in some of the beds in the variety plantings have continued to die out during the summer. It has been learned that the fungus *Sclerotium Delphinii* is one of the principal agents at work here. Later in the season the common bacterial rot was evident. As a species of *Fusarium* was also frequently found in decaying rhizomes, some experiments on the effect of soil sterilization were carried out.

A maggot of a fly, *Chaetopsis,* was found doing some damage to the irises, particularly the Japanese varieties. It is desirable that the work of this insect should be studied further, and a method of control worked out in the event that it should increase materially in numbers.

Particular attention has been given to the control of black spot and brown canker of roses. Beginning June 11, and continuing until September 13, a commercial preparation consisting mainly of ammoniacal copper-carbonate was applied to most of the roses at five-day intervals. The fungicidal value of this material proved to be fairly satisfactory and it left no unsightly residue on the foliage. A few varieties which are very susceptible to black spot developed some spotting in spite of the regular treatments. This was no doubt due to the fact that in July and August there were periods when rain fell on several consecutive days.

There were over 200 varieties in the Rose Garden which showed no black spot whatever up to the first week in October, which was at least two weeks after protection was withdrawn. These varieties may be considered fairly resistant, and it seems that black spot on them can be readily controlled. About 200 varieties showed some spotting during the summer at one time or another, but not enough to be of any consequence. A smaller number of varieties (45) proved to be rather highly susceptible to black spot, so that a very thorough application of the fungicide was necessary.

A certain number of beds of hybrid tea roses were dusted regularly with a sulphur dust, the particles of which had been dyed green. This dust is not particularly noticeable

on the foliage and it gives excellent control over black spot. All the roses dusted with this sulphur came through in splendid condition. The plants grew vigorously, retained their foliage, and blossomed fully.

Certain experiments tried out in August and September point to the benefits due to dusting with sulphur. It is planned another year to obtain further evidence as to the relative merits of these two fungicides. Details of the work on roses will be published in another connection.

I have continued research on various species of fungi in the laboratory, giving particular attention to the problems of sex in the fungi. Further progress has been made in hybridizing certain species.

B. O. DODGE,
Plant Pathologist.

REPORT OF THE SUPERVISOR OF PUBLIC EDUCATION

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to submit the following report for the year 1928. Since I came on duty July 1, this deals principally with the last half of the year.

LECTURES

Illustrated public lectures on botanical and horticultural subjects were given in the Museum Building on Saturday afternoons from February to November. The attendance has averaged 121 for the 43 lectures. The new projector, installed in July, has made it possible to show pictures much more satisfactorily than heretofore, and the attendance at lectures has noticeably increased. The maximum attendance was 239, on September 22, but exceeded 200 on July 14 and March 31 also.

Winter lectures at the Central Display Greenhouse were given as in previous years, in December and January. This winter these have been made strictly horticultural, since the greenhouse offers excellent opportunity to show the practical handling of plants. The attendance at these winter gardening lectures has been small, but made up largely of gardening enthusiasts. The average number during December was 54.

DEMONSTRATIONS FOR STUDENTS

In coöperation with the grammar and high schools, colleges and universities, thousands of students have received instruction at the Garden. These have usually come with their teachers and have had one or more guides from the Garden staff to accompany them. Mr. Wilson, Mr. Williams, Mr. Boynton, Mr. Fulling, or myself have usually accompanied these parties. In response to an invitation transmitted to them by Mr. Van Evrie Kilpatrick, of the Department of Education, nearly one thousand pupils of the public schools arranged for visits to the Garden during one

month this autumn. Large classes came also from the Roosevelt High School, the Evander Childs High School, the Teachers Training School, Hunter College, and Columbia University.

DOCENTRY

A considerable number of visitors, coming both singly and in parties, have received the personal attention of the Department of Public Education during the past half year. Among the larger groups were the Dutchess County Horticultural Society, the National Gardeners' Association, the American Nature-Study Society, and members of the Fourth International Congress of Entomology and of the American Phytopathological Society.

PUBLICITY

In order to reach the people in the suburbs of New York who are interested in gardening and in the activities of The New York Botanical Garden, weekly notes about lectures, flower displays, interesting plants, gardening operations and other timely matters have been sent to a large number of the local newspapers published within fifty miles of New York. This was begun the first of September, by sending items to 125 newspapers; and the same material was also forwarded to Mr. Grady at Columbia University, for the Associated Press and the metropolitan dailies. The response from this service, which has been continued up to date, and extended to garden clubs and to other newspapers on their request, has been most satisfactory, and has helped to keep the public informed about the activities at the Garden. From three to five items have been sent each week, totaling more than forty items during the past four months. Occasional articles have also been published from this department, in *Horticulture, The Gardeners' Chronicle, The American Florist,* and other magazines.

OUTSIDE LECTURES

In response to requests from garden clubs, schools, and other organizations, illustrated lectures have been given

from time to time by other members of the staff of the Botanical Garden as well as myself. Thus, lectures about the Botanical Garden and its work were given at the Bridgeport, Connecticut, Garden Club, the Teachers Training School, and the American Nature-Study Society at the American Museum of Natural History, and lectures on the Gladiolus were given at several meetings.

PERSONAL INVESTIGATIONS

Studies of inheritance in the genus *Gladiolus* and cross-breeding experiments were continued, though this work was interrupted by the transfer of my collection of seedlings and varieties to the Botanical Garden so late in the summer. A report of previous work on incompatibilities of *Gladiolus* varieties, was published in *The Gladiolus Review*, September, 1928.

Respectfully submitted,

FORMAN T. MCLEAN,

Supervisor of Public Education.

REPORT OF THE BIBLIOGRAPHER

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: Besides the usual bibliographic work, including assistance to those consulting the library, answers to queries received by mail, and approval of library purchases, the time of the bibliographer during the year 1928 has been taken up almost entirely by work on *North American Flora* and *Addisonia*.

Of *North American Flora*, the first three parts of volume 23 appeared during this year: Part 1, in February; part 2, in September; and part 3, in December. This has been possible only by the fact that these parts were edited chiefly by one of the authors (yourself), the bibliographer acting merely in an advisory capacity. Work on the manuscript of volume 18, which has proven unusually difficult, has progressed steadily throughout the year, and it should be possible to issue several parts of this volume, as well as a few parts in continuation of others, during 1929.

All four numbers of volume 13 of *Addisonia* have been issued during 1928. With the new volume, the bibliographer will be relieved of any editorial work in connection with this publication, with which he has been identified since its inception in 1916.

JOHN HENDLEY BARNHART,
Bibliographer.

REPORT OF THE LIBRARIAN

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: The chief occurrence of interest to the library during the past year has been the installation of electric lights. Those placed between the stacks in the main stack room are a great convenience, while the large and beautiful one suspended from the summit of the rotunda is sufficiently powerful to light the entire reading room. It would, however, seem to be more practical to have reading lamps upon the tables and smaller lights for the consultation of the catalogues, since there are few occasions when a general illumination is necessary.

There have been no extensive purchases of books during the past year, the two largest single ones being 150 works on horticulture and floriculture and 24 volumes of the Journal of the Swedish forestry society.

The principal accessions, with names of the donors in case of gifts, have been listed as heretofore in the *Journal*.

In accordance with the decision of the Scientific Directors, the annual census of the books will be omitted in the future, the statistics being compiled from the records alone.

The cataloguing of the Barnhart library purchased in 1926 is now completed, there having been accessioned during the past year 458 bound volumes and 456 unbound volumes and pamphlets.

There have been added to the library in addition to the 458 bound volumes just mentioned: by purchase, 206; by gift, 32; by exchange, 15; and by binding 739, including 15 volumes belonging to Columbia University and exclusive of 32 Garden books which were rebound, making a total of 1,450.

From the 36,946 bound volumes in the library at the close of 1927, there should be deducted 11 which were returned to Columbia in January, leaving a balance of 36,935, which, added to the 1,450 gained this year, make a total of 38,385 volumes at the close of 1928.

Approximately 260 pamphlets remaining from the

Geneva purchase of 1923 have been catalogued. Work upon the others will now progress as rapidly as time will permit. The arrangement of collections of other pamphlets for binding has been begun and will be continued during the coming year.

The total number of catalogue cards typewritten and filed during the year was 2,012; those issued by the Torrey Botanical Club and filed, 3,519; those issued by the Gray Herbarium and filed 4,927.

The following additions and corrections should be made to the serial list published in the Report of the Librarian for 1927. (Bulletin N. Y. Bot. Gard. **13**: 285-303.)

Omit the following:

*Bolus Herbarium (University of Cape Town) *Annals.*
International Institute of Agriculture, Rome, Italy. *Publications.*

Add the following:

*Annales Bryologici. The Hague, Holland.
Beiträge zur geobotanischen Landesaufnahme, Zürich, Switzerland.
*Die Pflanzenareale, Jena, Germany.
Liège. Institut Botanique de l' Université, Liège, Belgium. *Archives.*
New Zealand Institute, Wellington, N. Z. *Transactions and Proceedings.*
*Svenska Skogsvårdsföreningens Tidskrift, Stockholm, Sweden.
Voronezh. Society of Naturalists, Voronezh, U. S. S. R. *Bulletin.*

Change the following:

*Garden and Home Builder to American Home.
Buenos Aires. Museo de Farmacologia *Trabajos* to Buenos Aires. Instituto de Botanica y Farmacologia, *Trabajos.*

Respectfully submitted,

SARAH H. HARLOW,
Librarian.

REPORT OF THE PALEOBOTANIST

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to report as follows upon matters that have received my attention during the year 1928.

The most important item was the completion of my work on the paleobotany of Porto Rico, which was put through the press, and was issued October 1, as part 3 of volume 7 of the Scientific Survey of Porto Rico and the Virgin Islands.

A collection of about forty specimens of Tertiary plants, transmitted from the American Museum of Natural History for identification, was examined, and all identifiable specimens were named and labeled. Seven of the specimens, including three duplicates and four undescribed species, were donated in exchange for the work of identification. These may be found recorded under Lot No. 58 (Accession No. 26).

Several requests were received, from various sources, for identification of paleobotanical and supposed paleobotanical material, including fossil woods and a supposed fossil apple. All were given careful attention and were duly reported upon.

From named duplicate material in the fossil plant collections we furnished fourteen specimens for educational purposes to the Childrens' Museum at Saint Joseph, Mo., and eight specimens to the Department of Public Education of the American Museum of Natural History.

Accessions of paleobotanical literature included forty-five octavo and twelve quarto separates received as exchanges; one octavo donated, and one purchased. The fifty-seven pieces received as exchanges were from eighteen different authors, six of whom represent new contributors. This is the largest number of such accessions yet recorded for any one year. Incidentally it may be pertinent to note that only two of the eighteen authors are located in America.

During the later part of the year, as time permitted, I was occupied with the preparation of the manuscript of our joint work on the revision of the flora of Staten Island. This is now almost completed and will be ready for printing in the near future.

Five days were spent in the field—each one with a definite object in view, viz.: Annadale, Staten Island, collecting specimens of *Isotria verticillata* for the herbarium and for the rock garden; Dongan Hills (Todt Hill), Staten Island, to obtain photographs of the few remaining trees of *Ilex opaca;* Kensico Dam and contiguous territory, collecting specimens of *Liparis Loesleii* for illustration in Addisonia; Ulster County, N. Y., in the vicinity of New Paltz, investigating the sand dunes of the region and their accompanying flora; Bronx Park area, to obtain photographs of tree-root growth and rock disintegration for illustrations and for lantern slides. The item first mentioned was made the subject of an illustrated article in the August issue of Torreya; and articles based upon the other items are in preparation for publication. The successful accomplishment of the object of each of these field days was rendered possible through the courtesy and the enthusiastic coöperation of Mr. and Mrs. Henry C. Hartmann; and to the former I am also indebted for expert photographic work, whenever requested, in the field and indoors.

During the early part of the summer I had the pleasure of receiving and entertaining Dr. Richard Kräusel, Professor of botany and paleobotany at the University of Frankfurt-am-Main, Germany, who was on a visit to the United States and Canada, in order to study the Devonian flora of North America, both in the field and as represented in museum collections.

On July 7, I delivered a lecture, in the summer course of the Garden, on "The Story of the Redwoods."

I was in attendance at the Washington, D. C., meeting of the American Association of Museums, May 15-22; and

at the New York meeting of the American Association for the Advancement of Science and affiliated societies, during convocation week, December 26-31.

Respectfully submitted,

ARTHUR HOLLICK,
Paleobotanist.

REPORT OF THE SUPERINTENDENT OF BUILDINGS AND GROUNDS

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor to submit the following report for the year 1928:

REGULATING AND GRADING

During the past year considerable regulating and grading of the paths of the Garden has been accomplished. This was on the western side of the Bronx River along the Wood Road from the Iris Garden to the Linnaeus Bridge Entrance, where two paths were built.

The contractor working for the Empire Subway Company delivered about 5,000 yards of fill to the valley of the Long Lake.

During the year five men and two carts were assigned to the work of filling in the Long Lake, which is now about three-quarters filled.

DRAINAGE

One catch-basin and 6 feet of 6-inch drainage pipe were used for draining the side of the road at the Herbaceous Grounds. Two culverts and 40 feet of 6-inch drainage pipe were used to drain the sides of the path at south end of grounds near the Linnaeus Bridge. On the east side of the Bronx River south of the Long Bridge, the catch-basin and drainage pipe were moved to meet the change of grade. Wherever it was necessary, repairs were made to culverts and catch-basins throughout the Garden.

WATER SUPPLY

The water systems of the Museum Building, Conservatory Ranges 1 and 2, the Propagating Houses, the stables, the comfort stations, the Power Houses 1 and 2, and all of the drinking fountains around the grounds received extensive repairs.

PATHS

In order to connect the Linnaeus Bridge Entrance with

the Iris Garden, a path 10 feet wide and 1,150 feet long was built on the western side of the Bronx River. On the western side of the Wood Road a path 10 feet wide and 664 feet long was built to the Iris Garden, with three branch paths east and south, one branch path 10 feet wide and 120 feet long, one 10 feet wide and 100 feet long, and the other 10 feet wide and 110 feet long. On the east side of the Wood Road north of the Iris Garden a path 10 feet wide and 500 feet long, with a branch path 10 feet wide and 300 feet long into the Hemlock Grove. The hill paths leading to the Elevated Railway Entrance, Conservatory Range 1, Iris Garden, and the Japanese Cherry Collection were given a coat of Tarvia and a light cover of ashes.

BUILDINGS

At the Museum Building, the steam and water systems and the window sashes and doors received necessary repairs. Two coats of paint were given to the main hall at entrance to building. Four herbarium cases were built for the herbarium and one lantern-slide case was installed.

At the Conservatory Range 1 the interior and exterior of Houses 9 and 10 received two coats of paint; the glass and sash bars were removed and replaced; all the copper leaders of Houses 9 and 10 were replaced; the broken glass at Conservatory Ranges 1 and 2 and at the Propagating Houses was replaced by the painters.

At Power House 1, the fire-boxes were replaced in the five boilers.

At Power House 2, the fire-box of boiler No. 7 was replaced.

All necessary repairs were made to the steam system by our engineers.

GROUNDS

We have built and distributed on the grounds 100 concrete benches 7 feet long and 2 feet wide. The foundation 6 by 30 inches and 570 feet long for the nursery fence was completed.

Repairs were made to the one- and two-rail cedar fence.

The iron fencing received two coats of paint, and the maps and signs were repaired or replaced wherever necessary.

The Propagating Houses were supplied with fuel for four months from wood cut from dead or fallen trees. Nearly forty tons of hay were cut during the warm weather. The quarry at the Museum Building was worked for three months, to supply stone for new path work.

From May until September about a dozen picnics a week visited the Garden, the parties including from 75 to 1,000 children each. These children attended public, private, and Sunday schools of Greater New York, Long Island, New Jersey, and Connecticut and were escorted to the picnic grounds of the Garden by our special guards, who are assigned to these grounds daily during the summer months.

During the past year four uniformed police officers were assigned to the Garden from ten in the morning until six in the evening. They were assisted by two officers in civilian clothes. On Sundays and holidays ten guards, selected from the gardeners and laborers, assisted the keepers in patroling the grounds. About 325 summonses were served by the police officers for violations of park ordinances. The offenders were arraigned in the magistrates' courts and were fined from one to ten dollars each.

The number of visitors to the Garden has greatly increased this last year.

For twenty-four hours every day, special guards were assigned to the rose, gladiolus, and dahlia collections during the summer months.

Due to the watchfulness of our employees, very little damage has been done to the plantations throughout the grounds.

Respectfully submitted,

ARTHUR J. CORBETT,

Superintendent of Buildings and Grounds.

REPORT OF THE HONORARY CURATOR OF THE ECONOMIC COLLECTIONS

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: I have the honor of submitting the following report of the Economic Collections for the year 1928.

Owing to the large amount of work connected with my determination of South American plants, and the naming and describing of new forms, I have been obliged to refer the details of economic work to others.

In connection with the installation of new specimens received, the work of labeling specimens already installed and of rewriting labels requiring it, has been continued. Some hundreds of labels have been placed, and the manuscript for hundreds of others has been prepared for printing.

Special attention has been given to our collection of proximate principles of plants. The completion of this collection, generously undertaken by Messrs. Merck & Company, was interrupted by the world war. A large part of the work has now been done, and it will be completed during the early part of the coming year.

Respectfully submitted,

H. H. RUSBY,

Honorary Curator of the Economic Collections.

REPORT OF THE HONORARY CURATOR OF MOSSES

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Dear Sir: The most notable gift to the collection has been made by Eugene A. Rau of Bethlehem, Pennsylvania, who has presented to us his collection of mosses. His exchanges with contemporary bryologists included Leo Lesquereux, Thomas P. James, Thomas C. Porter, Coe Finch Austin, Charles Mohr, and John Macoun. In this way he accumulated a large and interesting herbarium of rare mosses, including many from Mexico, which will be a welcome addition to our collection.

Our correspondents have continued to send mosses for identification and comparison from various parts of the United States and Canada. Other exchanges have added specimens from Cuba, Jamaica, Porto Rico, Costa Rica, Venezuela, and Dutch Guiana, also from China. The Field Museum has contributed some mosses from Peru and two sets of Exsiccati have also been added to the collections.

Mr. Williams has continued to serve as President of the Sullivant Moss Society and contributed various articles to *The Bryologist*. Mr. Bartram has sent mosses from Texas, Jamaica, and Costa Rica for study and exchange and has recently published a list of the mosses collected by Paul C. Standley in Costa Rica, dedicating several new species to Mr. Williams and to me, in acknowledgment of our assistance in the determination of this collection.

The mounting of the George N. Best herbarium has been continued and so far 6,225 specimens have been accessioned.

In November the lantern slide collection was transferred to the care of Dr. Forman T. McLean, Supervisor of Public Education, and the Scientific Directors gave me a vote of thanks for the care of this collection.

Many letters of inquiry and applications for literature on

conservation have been received and leaflets have been freely distributed through the aid of the Stokes Fund for the Preservation of our Native Plants.

Respectfully submitted,

ELIZABETH G. BRITTON,

Honorary Curator of Mosses.

REPORT OF THE HONORARY CUSTODIAN OF THE LOCAL HERBARIUM

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: During 1928 various accessions were prepared for mounting and some accumulated material was distributed.

A collection of Crooke's Staten Island specimens heretofore not in the local collections was checked up with the herbarium and about 68 sheets chosen by you for incorporation with the Local Herbarium, about twice that number being laid aside as duplicate material.

Under your supervision the following plant families of the Bicknell collection were prepared for mounting: Caesalpiniaceae, Fabaceae, Cyperaceae (excl. of Carex). Duplicate labels were prepared at the same time, so these duplicates are available.

The work of the preliminary sorting of the unmounted material of the Bicknell collection into genera, species, and duplicates was carried on as usual, and the subsequent work of recording and writing labels for the already prepared material, and storing them away in sequence, covered the range of 37 families: Geraniaceae to Vacciniaceae. There are now 11,450 specimens prepared in the Bicknell Herbarium.

Some material from various old collections was selected for mounting during the year by Mrs. Mitchell and Mr. Wilson, and will be mounted as soon as time permits.

The accessions for 1928 total 111.

H. M. DENSLOW,

Honorary Custodian of the Local Herbarium.

REPORT OF THE CHAIRMAN OF THE SCIENTIFIC DIRECTORS

TO THE BOARD OF MANAGERS OF THE NEW YORK BOTANICAL GARDEN.

Gentlemen: The Board of Scientific Directors has lost two members during the year—Professor Herbert Maule Richards by death, and Professor William J. Gies by resignation on his retirement as Emeritus Professor of Biological Chemistry in Columbia University. We are fortunate in having as their successors Dr. H. M. Denslow, already Honorary Curator of the Local Herbarium, and Professor Marston T. Bogert, Professor of Organic Chemistry, Columbia University.

The scientific work of the Garden has been notably extended during the year by the addition to our staff of Dr. B. O. Dodge, who fills the new position of Pathologist, and Dr. F. T. McLean, who also fills a new position—that of Supervisor of Public Education.

The adequate care and protection from disease of our large and highly diversified plantations is a major obligation of the Garden, if we are to develop and hand on to coming generations unimpaired the wealth of plant life which the Garden had as its heritage from nature and which has been so notably increased by the gifts of its many benefactors. The national government and the states are expending vast sums in the attempt to protect and improve our agricultural fruit and truck crops, but with this as their first responsibility they have been able to give little time and attention to equally needed work on the diseases of ornamentals and the special problems of park and city planting.

The Garden is to be congratulated on being able, through the generous gift of the Carnegie Corporation, to provide more adequately for the organization of our educational relations, both with the school system and the general public. The so-called garden club movement and the development of higher standards of taste in matters of landscape

gardening and decorative planting lays upon us, as the largest and most strategically located botanical garden in the western hemisphere, a great responsibility for leadership.

Respectfully submitted,

R. A. HARPER,

Chairman of the Scientific Directors.

TREASURER'S REPORT FOR THE YEAR ENDING DECEMBER 31, 1928

EXHIBIT I

BALANCE SHEET

December 31, 1928

JOHN L. MERRILL, Treasurer

ASSETS

Permanent Fund Assets:			
Investments (Exhibit III)		$2,331,889.14	
Cash awaiting investment		694.54	
			$2,332,583.68
Balance of permanent fund assets expended for current uses (See current fund liability per contra)		38,752.56	
			$2,371,336.24
Current and Working Assets:			
Cash in banks and on hand:			
General purposes	$ 11,090.85		
Special purposes	21,207.51		
		$ 32,298.36	
Account receivable — City maintenance		23,835.64	
Interest and dividends receivable (Exhibit III)		31,008.80	
Prepaid insurance premiums		922.23	
		88,065.03	
		$2,459,401.27	

EXHIBIT I

BALANCE SHEET

December 31, 1928

LIABILITIES

Permanent Funds (Exhibit IV):		
Restricted endowments	$ 184,367.47	
Unrestricted endowments, including bequests set aside by the Board of Managers as permanent funds	2,169,497.57	
Special endowment, with life interest in respect of income therefrom	17,471.20	
		$2,371,336.24
Current Liabilities and Special Funds:		
Current liabilities:		
Accounts payable	5,023.14	
Special funds (Exhibit V):		
Unexpended income from restricted funds	$ 3,624.98	
Unexpended contributions set aside by the Board of Managers for specific purposes	17,582.53	
	21,207.51	
Deferred income credits:		
Membership dues paid in advance	$ 470.00	
Subscriptions paid in advance	707.50	
	1,177.50	
Balance of indebtedness to permanent funds for expenditures of fund assets for current uses		38,752.56
Surplus:		
Surplus at December 31, 1927	$ 14,179.39	
Add—Excess of income over expenditures for the year ending December 31, 1928 (Exhibit II)	7,724.93	
	21,904.32	
		88,065.03
		$2,459,401.27

CERTIFICATE OF AUDITORS

We have examined the books and accounts of The New York Botanical Garden for the year ending December 31, 1928, and certify that the attached balance sheet (Exhibit I) and relative statements (Exhibits II to V, inclusive) are correctly prepared therefrom, and, in our opinion, set forth fairly the financial position of the corporation as at December 31, 1928, and the transactions for the year ended on that date.

PRICE, WATERHOUSE & Co.

56 Pine Street, New York, March 28, 1929.

EXHIBIT II

Statement of Operations for the Year Ending December 31, 1928

	City maintenance	General	Restricted and special funds	Total
Income:				
Income from investments of permanent funds		$115,247.43	$ 9,165.62	$124,413.05
Contributions	$243,134.50	200.00	12,599.00	255,933.50
Membership dues:				
Annual		16,555.00		16,555.00
Sustaining		475.00		475.00
Sale of duplicate books and sundries		322.00		322.00
Subscriptions and sales of publications		2,831.23	2,440.54	5,271.77
Total income	$243,134.50	$135,630.66	$ 24,205.16	$402,970.32
Expenses:				
Maintenance and general expenses:				
Salaries of Director-in-Chief, assistants and Garden staff	$171,322.30	$ 65,876.00	$ 2,700.00	$239,898.30
Wages	27,688.75	32,964.10		60,652.85
Materials and supplies..	44,123.45	5,298.93		49,422.38
Stationery, printing, postage, etc.		4,473.75		4,473.75
Maintenance equipment purchased		830.27		830.27
Interest and exchange...		355.98		355.98
Insurance		1,406.04		1,406.04
Miscellaneous		3,950.89		3,950.89
	$243,134.50	$115,155.96	$ 2,700.00	$360,990.46
Improvements and exhibits:				
Improvements to buildings and grounds		$ 459.00		$ 459.00
Museum equipment purchased		909.30	$ 651.85	1,561.15
Laboratory equipment purchased		3,171.10		3,171.10
Library books, bindings, etc.			3,185.18	3,185.18
Museum specimens		831.84	590.12	1,421.96
Plant purchases and expenses		147.05	3,728.62	3,875.67
Botanical exploration and collections		505.80	388.77	894.57
Model Garden prizes			200.00	200.00
		$ 6,024.09	$ 8,744.54	$ 14,768.63
Expenses:				
Education and research:				
Public lectures and instruction			$ 2,582.84	$ 2,582.84
Scholarships, prizes, etc.		$ 225.00		225.00
Publications		5,459.69	5,740.41	11,200.10
Research		1,040.99	300.00	1,340.99
Investigation and preservation of native plants			35.14	35.14
		$ 6,725.68	$ 8,658.39	$ 15,384.07
Total expenses	$243,134.50	$127,905.73	$ 20,102.93	$391,143.16
Excess of income over expenses for the year.....		$ 7,724.93	$ 4,102.23	$ 11,827.16

EXHIBIT III

Summary of Investments, December 31, 1928

	Par value (No par value stocks at book value)	Approximate market value	Book value	Accrued interest and dividends Dec. 31, 1928	Average yield for year on basis of	
					Market value %	Book value %
General funds:						
Bonds	$ 542,000.00	$ 535,293.83	$ 527,919.63	$ 7,120.00	4.88	4.95
Stocks—						
Preferred ...	63,500.00	74,591.25	71,310.00	837.50	5.29	5.53
Common	14,700.00	29,179.50	17,091.67	220.50	3.02	5.15
	$ 620,200.00	$ 639,064.58	$ 616,321.30	$ 8,178.00	4.84	5.02
Sage Fund:						
Bonds	$ 515,000.00	$ 501,492.10	$ 462,613.81	$ 9,041.24	4.96	5.38
Stocks—						
Preferred ..	146,500.00	186,268.13	164,898.76	1,356.25	5.09	5.75
Common ...	71,900.00	239,512.00	106,885.10	2,339.98	3.59	8.05
	$ 733,400.00	$ 927,272.23	$ 734,397.67	$ 12,737.47	4.64	5.85
Special Endowment Fund:						
Bonds	$ 19,000.00	$ 19,475.00	$ 19,398.50	$ 395.83	4.88	4.90
Stocks—						
Preferred ..	360,000.00	466,865.62	434,831.88	4,800.00	5.05	5.42
Common ...	9,000.00	11,463.75	9,900.00	135.00	4.71	5.45
	$ 388,000.00	$ 497,804.37	$ 464,130.38	$ 5,330.83	5.03	5.39
John D. Rockefeller, Jr. Fund:						
Bonds	$ 201,000.00	$ 198,743.75	$ 200,760.25	$ 2,312.50	5.05	5.00
Preferred Stocks	254,137.50	325,737.50	298,825.01	2,450.00	4.95	5.42
	$ 455,137.50	$ 524,481.25	$ 499,585.26	$ 4,762.50	5.00	5.25
Special Trust Fund:						
Common Stock	$ 23,600.00	$ 46,846.00	$ 17,454.53		3.02	8.11
	$2,220,337.50	$2,635,468.43	$2,331,889.14	$ 31,008.80	4.81	5.43

Summary of Average Yields of Investments for Year

	On basis of Market Value	On basis of Book Value
Bonds	4.94%	5.12%
Stocks:		
Preferred	5.05	5.49
Common	3.50	7.56
	4.81%	5.43%

EXHIBIT IV

Statement of Permanent Funds, Showing Changes during the Year Ending December 31, 1928

	Balance at Jan. 1, 1928	Additions	Deductions	Balance at Dec. 31, 1928
Restricted endowments:				
Endowment for science and education	$ 89,115.49			$ 89,115.49
Addison Brown Fund	21,149.31			21,149.31
John Innes Kane Fund	35,347.63			35,347.63
Maria DeWitt Jesup Fund	25,000.00			25,000.00
Olivia E. and Caroline Phelps Stokes Fund	3,000.00			3,000.00
Charles Budd Robinson Fund	755.04			755.04
The H. H. Memorial Fund	5,000.00			5,000.00
Alexander P. Anderson and Lydia Anderson Fund for Research		$ 5,000.00		5,000.00
	$ 179,367.47	$ 5,000.00		$ 184,367.47
Unrestricted endowments:				
Endowment Fund	$ 229,443.06	$ 850.00		$ 230,293.06
David Lydig Fund	34,337.86			34,337.86
Students' Research Fund	5,656.00	350.00		6,006.00
William R. Sands Fund	10,000.00			10,000.00
Darius Ogden Mills Fund	48,099.17			48,099.17
Henry Iden Fund	10,000.00			10,000.00
Fanny Bridgham Fund	30,000.00			30,000.00
Francis Lynde Stetson Fund	25,000.00			25,000.00
Russell Sage and Margaret Olivia Sage Memorial Fund	725,012.39	51,783.75	2,498.00	774,298.14
Frances Griscom Parsons Fund	2,304.67			2,304.67
Special Endowment Fund	463,172.33	600.00		463,772.33
The John D. Rockefeller, Jr. Fund	500,000.00			500,000.00
The Charles Patrick Daly and Maria Lydig Daly Fund	19,636.34			19,636.34
The James A. Scrymser and Mary C. Scrymser Fund	12,750.00			12,750.00
The George N. Best Fund	3,000.00			3,000.00
	$2,118,411.82	$53,583.75	$ 2,498.00	$2,169,497.57
Special endowments:				
Special Trust Fund	$ 17,471.20			17,471.20
	$2,315,250.49	$ 58,583.75	2,498.00	$2,371,336.24

EXHIBIT V

SPECIAL FUNDS

Statement of Application of Income from Restricted Permanent Funds and Special Funds Designated for Specific Purposes

	Balance Jan. 1, 1928	Additions	Expenditures	Balance Dec. 31, 1928
Restricted permanent funds:				
Endowment for science and education:				
Public lectures and instruction, research and publications other than "Addisonia"	$ 1,575.14	$ 4,430.26	$ 5,840.27	$ 165.13
Addison Brown Fund:				
Publication of "Addisonia"		3,487.76	3,487.76	
John Innes Kane Fund:				
Plant purchases and expenses	1,339.90	1,757.27	2,104.30	992.87
Maria DeWitt Jesup Fund:				
Botanical collections and binding of books	1,503.64	1,242.85	1,384.87	1,361.62
Olivia E. and Caroline Phelps Stokes Fund:				
Investigation and preservation of native plants	433.40	153.34	35.14	551.60
Charles Budd Robinson Fund:				
Exploration	38.94	37.54		76.48
The H. H. Memorial Fund:				
Development of model gardens	180.14	248.57	200.00	228.71
Alexander P. Anderson and Lydia Anderson Fund for Research...		248.57		248.57
	$ 5,071.16	$ 11,606.16	$ 13,052.34	$ 3,624.98
Special Funds contributed for specific purposes:				
Contributions of Trustees of Carnegie Corporation for program of public education	$ 12,000.00	$ 6,000.00	$ 5,417.47	$ 12,582.53
Contributions for Garden Club lectures	34.12		34.12	
Contributions for crocus bulbs		1,599.00	1,599.00	
Bequest of William Gilman Thompson, designated by Executive Committee for construction of shelter house		5,000.00		5,000.00
	$ 12,034.12	$ 12,599.00	$ 7,050.59	$ 17,582.53
	$ 17,105.28	$ 24,205.16	$ 20,102.93	$ 21,207.51

REPORT OF THE COMMITTEE ON PATRONS, FELLOWS AND MEMBERS FOR THE YEAR 1928

The number of new members who have qualified is 251. The number of annual members is now 1,764, a net increase of 129 during the year. Life members 121; fellowship members 1; sustaining members 20.

Of the annual members 84 are now in arrears for dues for 1928, 25 for dues for 1927 and 1928, 25 for dues for 1926, 1927, and 1928.

Dues have been collected to the amount of $16,900.

Three persons have qualified as life members by the payment of $250 each. These sums have been transmitted to the treasurer.

A complete list of all classes of members to date is herewith submitted.

Benefactors

Edward D. Adams,
*Mrs. Fanny Bridgham,
*Hon. Addison Brown,
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GENERAL INDEX

Accounts, 49-59, 83-86, 142-147, 318-323, 394-99
Addisonia, 11, 32, 104, 113, 124, 189, 206, 265, 282, 359, 379
Advisory Council, Honorary Members of the, 82, 172, 255, 350, 427
  Members of the, 82, 171-2, 255, 350, 427
Annual Members, 63-82, 151-171, 235-255, 327-350, 403-27
Assistant Director. Investigations. (See Howe, M. A.)
Auditors, Certifications, etc. (See Accounts)
Auxiliary, Women's. (See Advisory Council)
10, 107

Barnhart, John H. Reports of the Bibliographer, 31, 124, 206, 282, 379
Benefactors, 60, 148, 232, 324, 400
Bibliographer, Reports, 31, 124, 206, 282, 379
Bicknell, E. P., 104, 359, 391
Boynton, Kenneth R. Reports of the Head Gardener, 23, 115, 197, 266, 361.
Britton, Elizabeth G. Investigations, 187
  Reports of the Honorary Curator of Mosses, 42, 136, 219, 313, 389
Britton, N. L. Investigations, 14, 107-8, 187-88
  Reports of the Secretary and Director-in-Chief, 7, 95, 181, 257, 351
Buildings, Bridges, and Grounds, Superintendent of. Reports, 34, 127, 210, 304, 385

Carnegie Corporation, 176, 392. (See Endowments)
Certificate of Auditors, 59, 147, 227, 319, 394
Chairman of the Board of Scientific Directors. Reports, 44, 140, 223, 316, 392
Committee on Patrons, Fellows and Members. Reports, 60, 148, 232, 324, 400
Conservatories, 10, 25, 116, 198, 362
Contributions, 11, 104, 189
Contributions from Members, 9, 14, 15, 95, 189-90, 366. (See also N. Y. Bot. Gard., Gifts)
Corbett, Arthur J., 24, 183
  Reports of the Superintendent of Buildings and Grounds, 34, 127, 210, 304, 385

Dahlia Collection, 8, 25, 91, 182, 223, 268, 352, 362
Denslow, H. M. Reports of the Honorary Custodian of the Local Herbarium, 43, 139, 222, 315, 391
Director-in-Chief. Reports, (1924) 7; (1925) 95; (1926) 181; (1927) 257; (1928) 351
Director of Laboratories. Reports, 28, 120, 201, 278, 368
Docentry, etc., 10, 103, 176, 186, 259, 353, 377 (see Wilson, P., and McLean, F. T.)
Dodge, B. O. Investigations, 365, 392. Report, 373

Eaton, M. E., 11, 22, 137
Edison, Thomas A. 359. (See Small, J. K.)
Endowments, 11, 173, 176, 392. (See President's Report, 1926)
Executive Committee, Reports of the President and Chairman of the, 1, 87, 173

Fellows for Life, 61, 149, 233, 325, 401
Financial Accounting, 49-59, 83-86, 94, 142-147, 319-323, 394-99
Flora, North American, 11, 31, 32, 104, 105, 124, 206, 263, 282, 357, 358
  of British Guiana, 12, 263, 358. (See Gleason, H. A.)
Floral Displays, 23, 46, 115-18, 197-200, 259, 266-272, 351, 352, 362, 363
Fossil Flora (See Hollick, Arthur)
  from Brazil, 40
  of the West Indies, 11, 13
  of Porto Rico, 187, 217
  of Staten Island, 217
  Plants, 187
Fungi, 12, 21, 44, 45, 106, 188, 264

Garden:
Dahlia, 8, 25, 117, 198, 268, 352, 362
Gladiolus, 8, 26, 117, 199
Hyacinth, 26, 117, 199
Iris, 8, 23, 25, 117, 198, 268, 352, 368
Lilac, 26, 118, 199, 269
Rock, 27, 118, 199, 269
Rose, 8, 25, 27, 117, 198, 352, 362
Other kinds, 23, 24, 25, 26, 117-18, 199, 268, 352, 363
Greenhouse Collections, 9, 10, 24, 97, 98, 115, 197, 266, 361
Geneva Library Acquisitions, 10, 206, 207, 381
Gifts to the Garden. (See N. Y. Bot. Gard.)
Gladiolus Displays, 8, 26, 117, 198, 269
Gleason, H. A. Investigations, 11, 12, 20, 44, 105, 111, 187, 193, 263, 357
with Cook, M. T., 187, 193
with Moore, Richards and Stout, 11
with Sprague, T. A., 12
with Royal Bot. Gard., Kew, Eng., 12, 357-8

Harper, R. A. Reports of the Chairman of the Scientific Directors, 44, 140, 223, 316, 392
Harlow, Sarah H. Reports of the Librarian, 32, 125, 207, 284, 380
Head Curator of the Museums and Herbarium. Reports, 18, 109, 191, 261, 355
Head Gardener. Reports, 23, 115, 197, 266, 361
Hemlock and its Environment, 11. (See Gleason, H. A.)
Herbaceous Grounds, 9, 17, 25, 116, 182, 198, 268, 352
"H. H. Memorial Fund," The. 90, 96, 147, 178, 258, 352
Hollick, Arthur. Investigations, 11, 13, 107, 187, 356
Reports, 40, 134, 217, 309, 382
with Prof. Berry, 13
with U. S. Geological Survey, 40
Honorary Curator of Mosses, Reports, 42, 136, 219, 313, 389
Honorary Curator of the Iris and Narcissus Collections, 273, 364
Horticultural Grounds, 7, 8, 23, 90, 115, 361
Howe, Marshall A. Investigations, 13, 14, 104, 188
with U. S. Geological Survey, 13, 105
Dahlia Collections, 13, 25, 91, 97, 182, 188
Hoyt, Mrs. Sherman, 362
Hyacinth Display, 26, 117, 199, 269
Instruction, Public. (See Public Education)

Irises—366
Displays, 7, 8, 25, 91, 223, 364
Test Garden, 8, 364, 365

Japanese Cherries, 8, 358, 373
Journal of the New York Botanical Garden, 1, 11, 44, 104, 380

Kemp, James Furman, 223
Kunderd, A. E. Gift of Gladiolus corms, 8, 26

Labeling, 27, 353, 363
Laboratories, Director of the. Reports, 28, 120, 201, 278, 368
Lantern Slide Collection, 43, 137, 219-20, 314, 351, 353, 389
Lectures, illustrated. 10, 41, 102, 186, 358, 363, 376
Lee, Frederic S. Reports of the President and Chairman of the Executive Committee, 1, 87, 173
Librarian. Reports, 32, 125, 207, 284, 380
Library:
Additional purchases, 10, 125, 187, 207, 218, 283, 353, 380
Catalogue, 33, 125, 207, 259, 353
Census, 32, 125
Life Members, 61, 149, 233, 401-3
Local Herbarium, 43, 139, 222, 265, 315
Lilies. (See Stout, A. B. Investigations)
Lorillard Mansion, 16, 100

Members, Annual, 63, 151, 235, 403
Fellowship, 61, 149, 233
Life, 61, 149, 233
Sustaining, 63, 151, 235
McLean, Forman T., 361, 389, 392
Merrill, John L., 83, 226, 318 (See also Treasurer, Reports)

Mitchell, Mrs. Wm., 21, 43, 106, 112, 139, 195, 264-5, 315, 359, 391
Model Gardens, 89
The "H. H. Memorial," 90, 96, 178, 258, 352
Mojave Desert Exhibit, 362
Mosses, Honorary Curator of. Reports, 42, 136, 219, 313, 389
Mulford Exploration, 40, 215
Museums, 109
Economic, 18, 109, 191, 261, 355, 356
Fossil Plant, 19, 110, 261, 355, 356
Systematic, 19, 110
Mycologia, 11, 12, 21, 104, 112, 189, 358
Narcissus. (See Peckham, Mrs. W. H.)
Displays, 9, 26, 91, 95, 362, 366
Fund, Contributors to the, 9, 95

Native American Wild Flowers, 42, 43, 137, 220, 313
New York Agricultural Experiment Station, The. (See Stout, A. B., Investigations)
New York Botanical Garden, The
Buildings and Grounds, 36, 37, 129, 181, 211, 257, 305, 306, 351, 386
Drainage, 7, 34, 127, 183, 210, 258, 351, 385
Floricultural Collections, 23, 46, 115-18, 197-200, 259, 266-272, 356, 352
Gardening Staff, The, 23-24, 115, 197
Geology, 41 (See Hollick A., Reports)
Gifts, 7, 8, 9, 11, 14, 15, 18, 24, 26, 27, 28, 39, 41, 89, 95, 96, 100, 101, 104, 109, 125, 173, 182, 189-90, 191, 219, 220, 257, 261, 267, 313, 355, 361, 362, 365, 366, 389
Natural Features, 2, 47
Paths, 35, 99, 128, 181-2, 211, 257, 305, 351-2, 385
Recommendations regarding Improvements, 1, 2, 3, 4, 5, 6, 92, 100, 102, 173, 177, 184, 258, 354
Regulating and Grading, 34, 101, 127, 185, 210, 304, 385
Topography, 47, 175, 224
Water Supply, 7, 35, 128, 211, 305, 385

North American Flora, 11, 31, 32, 104, 105, 124, 206, 263, 282, 357, 358
Olmsted Brothers, Report of (1924) 2, 3, 4, 5, 6, 92, 101, 177, 184-5
Paleobotanist, Reports. 40, 134, 217, 309, 382
Park Department, 184, 351, 354
Operations, 16, 98
Police Protection, 181, 258, 353, 354, 387
Pathologist, 45-6, 358
Patrons, 60, 148-9, 232, 324, 400-1
Peckham, Mrs. Wheeler H. (Ethel Anson S.) 7, 25, 26, 27, 91, 95, 113, 182, 197, 273, 359, 364 (See also Honorary Curator of the Iris and Narcissus Collections)
Phytopathologist, 183
Plant Ecology, 187 (See Gleason, H. A.)
Plant Pathology, 45, 358, 373 (See Dodge, B. O.)
President and Chairman of the Executive Committee. (See Reports)
Price, Waterhouse & Co., 147, 227, 319, 394
Prize Gardens, 89, 90, 96, 178, 258, 361
Public Education, 13, 103, 104, 351, 353, 376, 377, 392
Publications: 354
Addisonia, 11, 32, 104, 113, 124, 189, 206, 265, 282, 359, 379
Bulletin, 11, 104
Contributions, 11, 104, 189
Journal, 1, 11, 44, 104, 380
Mycologia, 11, 12, 21, 104, 112, 189, 358
North American Flora, 11, 31, 32, 104, 105, 124, 206, 263, 282, 357, 358

Rau, Eugene A. 389 (See N. Y. Bot. Gard., Gifts)
Registered Students, 31, 123, 104, 281, 371

Reports:
Bibliographer, 31, 124, 206, 282, 379
Chairman of the Board of Scientific Directors, 44, 140, 223, 316, 392

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